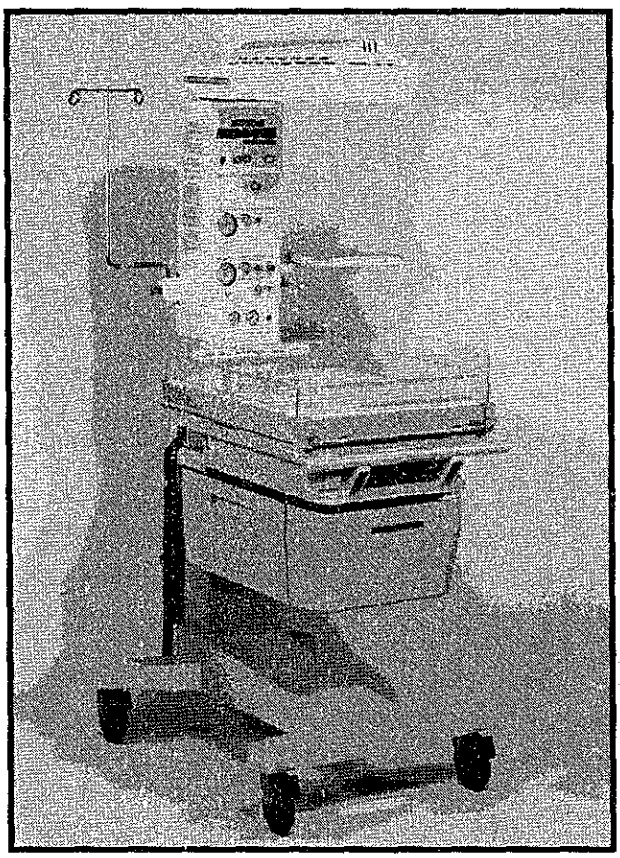
Hill-Rom

SERVICE MANUAL

RESUSCITAIRE®
Radiant Warmer
From Hill-Rom Air-Shields



Product: RW82-1, 1E and 1C

For Parts Or Technical Assistance
USA (800) 445-3720 Canada (800) 267-2337
International: Contact your distributor.

man221rd

LIMITED WARRANTY

The product being described in this manual is warranted against defects in materials or workmanship for one year from the date of shipment from Hill-Rom Air-Shields, Inc., Hatboro, with the following exceptions:

All consumable and disposable products are guaranteed to be free from defects upon shipment only.

Calibrations are considered normal maintenance and are not included in the 1 year warranty.*

During the warranty period any defective parts other than those listed above will be replaced at no charge to the customer. There will be no labor charge for replacing the parts within the continental U.S.

This warranty is rendered void and Hill-Rom Air-Shields, Inc. cannot be held liable for conditions resultant therefrom if:

1. Damage to the unit is incurred as a result of mishandling.
2. The customer fails to maintain the unit in a proper manner.
3. The customer uses any parts, accessories, or fittings not specified or sold by Hill-Rom Air-Shields, Inc.
4. Sale or service is performed by a non-certified service/dealer agency.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PURPOSE. HILL-ROM AIR-SHIELDS' OBLIGATION UNDER THESE WARRANTIES SHALL NOT INCLUDE ANY LIABILITY FOR LOSS OF PROFITS, DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES OR DELAYS. Some states, provinces, or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply. Any improper or negligent use, any alterations or repairs not in accordance with Hill-Rom Air-Shields' manuals or performed by others in such manner as in Hill-Rom Air-Shields' sole judgement affects the product materially and adversely, shall void these warranties. These warranties do not cover failures due to misuse, abuse, neglect, or lack of routine maintenance. No employee or representative of Hill-Rom Air-Shields is authorized to change these warranties in any way or grant any other warranty unless in writing and signed by a Hill-Rom officer. These warranties provide specific legal rights; but, there may be other available rights; which vary from state to state, province to province, or country to country.

*The Accreditation Manual for Hospitals requires each piece of equipment to be tested prior to initial use and at least annually thereafter. To comply with this standard, we recommend that you participate in our Preventive Maintenance Program during the warranty period. This service can be performed by certified technicians through our Product Service Group and authorized dealers.

SERVICE

For optimal performance, product service should be performed only by qualified service personnel. Technical Services representatives are located throughout the United States and Canada and are dispatched for required maintenance by calling USA (800) 445-3720 and Canada (800) 267-2337. Customers outside the U.S. and Canada should contact their local factory-authorized Hill-Rom Air-Shields' distributor for service.

Hill-Rom Air-Shields®
A HILLENBRAND INDUSTRY
330 Jacksonville Road, Hatboro, PA 19040

CAT. NO. 82 990 07-7
E 1 2 3 4 5 6 7 8 9
A 1 2 3 4 5 6 7 8 9

man221rd

© 1999 by Hill-Rom Company, Inc. ALL RIGHTS RESERVED.

Printed in USA	10/96
Change 1	8/97
Change 2	6/98
Change 3	10/98
Change 4	4/99
Change 5	9/99
Change 6	12/99

Hill-Rom Air-Shields
A HILLENBRAND INDUSTRY

Resuscitaire® Radiant Warmer Service Manual Correction (man221rd)

Since the release of the *Resuscitaire® Radiant Warmer Service Manual* (man221rd), minor inaccuracies have been found that require updating. Listed below are the page numbers and corrections that require updating. **Mark these in your service manual**. These corrections will be made during the next revision of the service manual. If you have any questions, contact Hill-Rom Technical Support at (800) 445-3720.

Page Number	Correction Required
Page ii	In the section "Symbols," add the warning labels from page 5 of this document.
Page 2-1	In the section "2.2 Assembly," add the following: **WARNING:** Cylinder heights may vary. When replacing a gas cylinder, ensure that the tank does not exceed the maximum tank height specification. Also, prior to placing the cylinder, confirm that there is sufficient clearance between the bottom of the tank and the floor when the Resuscitaire VHA is in its lowest position. After these checks have been completed, raise the VHA to its maximum height and install/ remove the cylinder. Failure to do so could result in personal injury or equipment damage.
Page 2-2	Replace Figure 2.1 with the figure on page 6 of this document.
Page 3-3	Replace Table 3.1A with pages 7 to 10 of this document.
Page 3-5	Replace Table 3.1B with pages 11 to 14 of this document.
Page 3-12	Add page 15 of this document regarding the Gas Delivery Module and Figure 3.9.
Page 3-18	Replace the section "Reserve Gas Supply" with the following: **Reserve Gas Supply** On American units, the regulator is preset at 65 psi (448 kPa) when the cylinder pressure is 1200 psi (8274 kPa). On United Kingdom and Canadian units, the regulator is preset at 45 psi (310 kPa) when the cylinder pressure is 1500 psi (10342 kPa). The output varies with the input pressure.

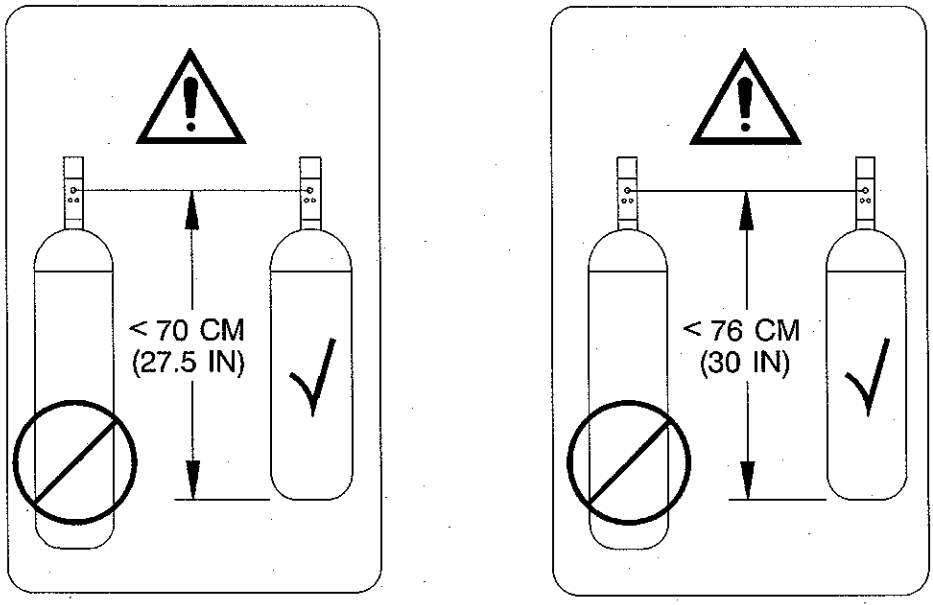
© 2003 by Hill-Rom Services, Inc. ALL RIGHTS RESERVED.

Page 3-18	In the section "Resuscitation Module," replace the caution with the following: **CAUTION:** If the knob is removed, calibrate the unit (refer to "5.12 Resuscitation Module Check and Calibration Procedures" on page 5-44). Failure to do so could result in equipment damage.
Page 4-1	In the section "4.1 General," add the following: **WARNING:** Cylinder heights may vary. When replacing a gas cylinder, ensure that the tank does not exceed the maximum tank height specification. Also confirm that there is sufficient clearance between the bottom of the tank and the floor when the Resuscitaire VHA is in its lowest position prior to placement. After these checks have been completed, raise the VHA to its maximum height and install/remove the cylinder. Failure to do so could result in personal injury or equipment damage.
Page 4-4	In the section "Metal Surfaces," add the following: **WARNING:** The heater element may be hot enough to cause burns. Before cleaning the warmer head, allow 30 minutes for the unit to sufficiently cool. Failure to do so could result in personal injury.

Page 4-5	In the section "4.5 Reassembly After Cleaning," add the following: **WARNING:** Cylinder heights may vary. When replacing a gas cylinder, ensure that the tank does not exceed the maximum tank height specification. Also, prior to placing the cylinder, confirm that there is sufficient clearance between the bottom of the tank and the floor when the Resuscitaire VHA is in its lowest position. After these checks have been completed, raise the VHA to its maximum height and install/ remove the cylinder.
Page 5-2	Replace the section "5.2.2 Resuscitation Calibration" with page 16 of this document.
Page 5-2	Replace the section "5.3 DC Power Requirements" with page 17 of this document.
Page 5-30	In Table 5.1: Troubleshooting Guidelines for System Error Codes," replace the row for **Error #21** with page 18 of this document.
Page 5-36	In the section "5.11.2 Removing and Replacing the Back Cover," add the following: **WARNING:** Cylinder heights may vary. When replacing a gas cylinder, ensure that the tank does not exceed the maximum tank height specification. Also, prior to placing the cylinder, confirm that there is sufficient clearance between the bottom of the tank and the floor when the Resuscitaire VHA is in its lowest position. After these checks have been completed, raise the VHA to its maximum height and install/ remove the cylinder. Failure to do so could result in personal injury or equipment damage.

Page 5-39	In the section "5.11.6 Removing and Replacing the Gas Supply Module," add the following: **WARNING:** Cylinder heights may vary. When replacing a gas cylinder, ensure that the tank does not exceed the maximum tank height specification. Also, prior to placing the cylinder, confirm that there is sufficient clearance between the bottom of the tank and the floor when the Resuscitaire VHA is in its lowest position. After these checks have been completed, raise the VHA to its maximum height and install/ remove the cylinder. Failure to do so could result in personal injury or equipment damage.
Page 5-40	Replace section "5.11.7 Removing and Replacing the Quartz Heating Element" with pages 19 through 24 of this document.
Page 5-43	Add sections "5.11.9 Removing and Replacing the Heater Grill" and "5.11.10 Removing and Replacing the Warmer Head Top Cover" found on pages 25 through 29 of this document.
Page 6-13G	Replace Figure 6.1E with page 30 of this document
Page 6-13L	Add items 19 through 21 to the Label List as follows: • Label, Caution, Hi Pressure, Eng.....8200300 • Label, Warning, Max Cylinder HT (<70 cm).....8200315D • Label, Warning, Max Cylinder HT (<76 cm).....8200315E
Pages 6-20 through 6-22	Replace with page 31 through page 36 of this document.
Pages 6-36 through 6-50	Replace with page 37 through page 60 of this document.
Pages 7-8 and 7-9	Replace with foldouts FO 7-8 and FO 7-9 of this document.

Warning Labels, Maximum Tank Height



m221de214

Figure 2.1: Installation

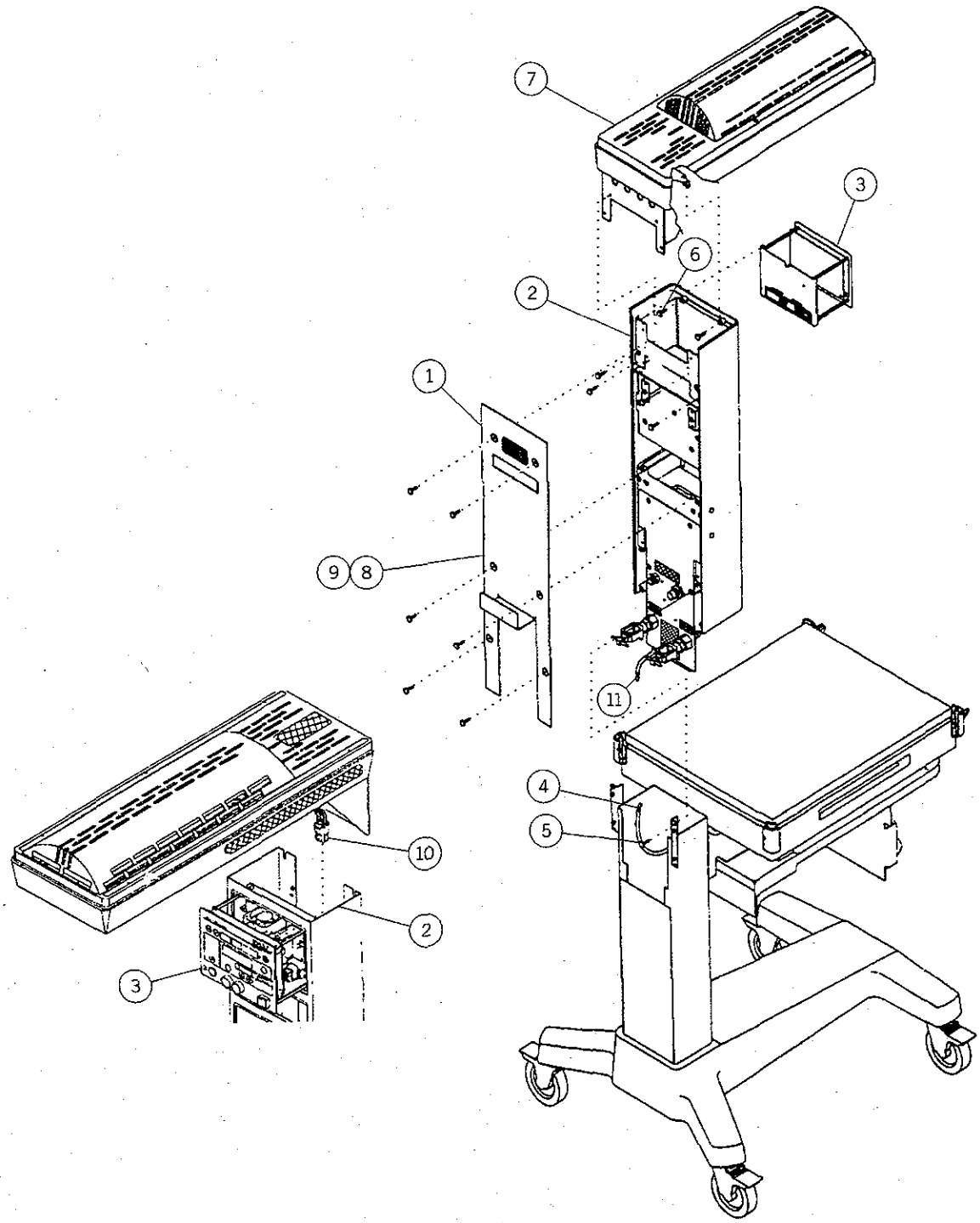


Table 3.1A Specifications

POWER REQUIREMENTS	
120V Models (North America)	120V, 60 Hz, 750W
100V Models (Japan)	100V, 50/60 Hz, 750W
220/240V Models (IEC)	220/240V, 50/60 Hz, 750W
OVERLOAD PROTECTION	
120V Models (USA)	Dual 12A Circuit Breakers
100V Models (Japan)	Dual 12A Circuit Breakers
220/240V Models (IEC)	Dual 6A Circuit Breakers
CHASSIS LEAKAGE CURRENT	
100V and 120V Models	300 µA maximum
220V and 240V Models	500 µA maximum
EXAMINATION LIGHT	>100 Foot Candles (0.11 lumens/$cm^{2)}$
ALARMS	
High Temperature	Activates if Skin Temperature Probe is attached and the skin temperature sensor reaches 39.0°C. Resets at 38.5°C.
Chk Patient	Activates in Manual Mode after 10 mins. Remains on with audible alarm every 30 s. for 5 mins.; totalling 15 mins. Then heater is turned Off.
Apgar Timer	Activates at the 1-, 5-, and 10-minute Apgar Time intervals.
Power Fail	Activates when power is lost.
Probe	Activates if Skin Temperature Probe fails (open or short).
System Fail	Indicates system failure; refer to paragraph 5.10.
Baby Temp	Activates if Baby Temperature fluctuates 1°C above or below set point.

Electrical Module Audio Alarms	Tone Frequency: 1.2 KHz maximum Three-Stage sound level: 15 s low, 15 s medium, then high.
Blender Module Pneumatic Audio Alarm	Vibrating reed
DISPLAYS	
Skin Temperature Display Range	18 to 40°C (64.4 to 104°F)
Skin Temperature Display Accuracy	±0.2°C for 31°C to 37°C (88°F to 98.6°F)
Skin Temperature Display Resolution	0.1°C (0.5°F)
Apgar Timer Display Range	0:00 to 59:59 (mins:secs)
Apgar Timer Display Accuracy	0 ± 1 s
Apgar Timer Display Resolution	1 s
MANUAL HEAT CONTROL	Adjustable in 10% increments from zero to full power (100%).
DATA PORT	2400 Bits/second fixed Baud Rate. RS232C compatible
MATTRESS TILT	0, 5, and 10 degrees
DIMENSIONS AND WEIGHT	
Mattress Height	100 cm (39.4")
Height	188 cm (74")
Width (Side to Side)	72.4 cm (28.5")
Depth (Front to Back)	111.8 cm (44")
Weight	91 kg (200 lbs.)
ENVIRONMENTAL	
Operating Temperature Range	18°C to 30°C (64.4°F to 86°F) ambient
Storage Temperature Range	- 20°C to + 45°C (- 4°F to + 113°F) ambient
Relative Humidity Operating Range	5% RH to 95% RH, non-condensing
RESUSCITATION (w/AutoBreath™ feature, PN 8140080; w/o AutoBreath™ feature, PN 8140072)	
Wall Supply Pressure	40 psi (276 kPa) to 75 psi (517 kPa)
Cylinder Pressure	3000 psi (20684 kPa) maximum

Cylinder Length (with VHA)	70 cm (27.5")
Cylinder Length (with VHA and spacer) ♦	76 cm (30")
Cylinder Diameter	10 - 12 cm (4 - 5") maximum
Suction Circuit Adjustable Suction Intensity	0"H_2O (0 mm Hg) to 80"H_2O (150 mm Hg)
Patient Gas Supply Airway Pressure Limit, Operator Adjustable	0 to 50 cm H_2O ± 10% (4.9kPa)
Patient Gas Supply Fixed Pressure Relief, Factory Set	60 cm H_2O ± 10% (5.9kPa)
Primary Outlet Supply Pressure Limit	160.1 cm H_2O (15.7 kPa) ± 20%
Primary Outlet Flow Range	0 lpm to 15 lpm
Auxiliary Supply Pressure Limit (w/o AutoBreath™ feature)	160.1 cm H_2O (15.7 kPa) ± 10% maximum
Auxiliary Supply Pressure Limit (with AutoBreath™ feature)	160.1 cm H_2O (15.7 kPa) ± 10% maximum
Auxiliary Flow Circuit Flow Range	0 lpm to 15 lpm
Auxiliary Flow Circuit Pressure	160.1 cm H_2O (15.7 kPa) ± 10% maximum
AutoBreath™ feature (Factory Installed Option)	
I/E Ratio	Fixed at 1:2 ± 20%
PEEP Ratio	0 to 18 ± 4 cm H_2O (1.8 ± 0.4 kPa)
Breath Rate	18 to 60 BPM ± 10% of setting
Adjustable Airway Pressure Relief	0 to 50 ± 5 cm H_2O (4.9 ± 0.5 kPa)
Fixed Maximum Pressure	60 cm H_2O ± 10% (5.9 kPa ± 10%)
Oxygen Consumption	50 lpm maximum
RESUSCITATION (w/AutoBreath™ feature, PN 8140081; w/o AutoBreath™ feature, PN 8140073)	
Wall Supply Pressure	40 psi (276 kPa) to 75 psi (517 kPa)
Cylinder Pressure	3000 psi (20684 kPa) maximum

Cylinder Length (with VHA)	70 cm (27.5")
Cylinder Length (with VHA and spacer)	76 cm (30")
Cylinder Diameter	10 - 12 cm (4 - 5") maximum
Suction Circuit Adjustable Suction Intensity	0"H_2O (0 mm Hg) to 80"H_2O (150 mm Hg)
Patient Gas Supply Airway Pressure Limit, Operator Adjustable	0 to 50 cm H_2O ± 10% (4.9kPa)
Patient Gas Supply Fixed Pressure Relief, Factory Set	50 cm H_2O ± 20% (5.0kPa)
Primary Outlet Supply Pressure Limit	160.1 cm H_2O (15.7 kPa) ± 20%
Primary Outlet Flow Range	0 lpm to 15 lpm
Auxiliary Supply Pressure Limit (w/o AutoBreath™ feature)	160.1 cm H_2O (15.7 kPa) ± 10% maximum
Auxiliary Supply Pressure Limit (with AutoBreath™ feature)	40 cm H_2O (4 kPa) ± 10% maximum
Auxiliary Flow Circuit Flow Range	0 lpm to 15 lpm
Auxiliary Flow Circuit Pressure	40 cm H_2O (4 kPa) ± 10% maximum
AutoBreath™ feature (Factory Installed Option)	
I/E Ratio	Fixed at 1:2 ± 20%
PEEP Ratio	0 to 18 ± 4 cm H_2O (1.8 ± 0.4 kPa)
Breath Rate	18 to 60 BPM ± 10% of setting
Adjustable Airway Pressure Relief	0 to 50 ± 5 cm H_2O (4.9 ± 0.5 kPa)
Fixed Maximum Pressure	50 cm H_2O ± 10% (5.0 kPa ± 10%)
Oxygen Consumption	50 lpm maximum
MONITOR SHELF DIMENSIONS	14.0" (35.6 cm) x 12.0" (30.5 cm)

- Data Tag Reference 82VHA part numbers:
  8201080 and 8201081
  8201170 and 8201171

Table 3.1B Specifications—CE-Mark Version

POWER REQUIREMENTS	220/240V, 50/60 Hz, 750W
OVERLOAD PROTECTION	Dual 6A Circuit Breakers
CHASSIS LEAKAGE CURRENT	500 µA maximum
EXAMINATION LIGHT	>0.11 lumens/cm^2 (100 Foot Candles)
ALARMS	
High Temperature	Activates if Skin Temperature Probe is attached and the skin temperature sensor reaches 39.0°C. Resets at 38.5°C.
Chk Patient	Activates in Manual Mode after 10 mins. Remains on with audible alarm every 30 s. for 5 mins.; totalling 15 mins. Then heater is turned Off.
Apgar Timer	Activates at the 1-, 5-, and 10-minute Apgar Time intervals.
Power Fail	Activates when power is lost.
Probe	Activates if Skin Temperature Probe fails (open or short).
System Fail	Indicates system failure; refer to paragraph 5.10.
Baby Temp	Activates if Baby Temperature fluctuates 1°C above or below set point.
Electrical Module Audio Alarms	Tone Frequency: 1.2 KHz maximum Three-Stage sound level: 15 s low, 15 s medium, then high.
Blender Module Pneumatic Audio Alarm	Vibrating reed
DISPLAYS	
Skin Temperature Display Accuracy	±0.2°C for 31°C to 37°C (88°F to 98.6°F)
Skin Temperature Display Resolution	0.1°C (0.5°F)
Apgar Timer Display Range	0:00 to 59:59 (mins:secs)
Apgar Timer Display Accuracy	0 ± 0.5 s

Apgar Timer Display Resolution	1 s
MANUAL HEAT CONTROL	Adjustable in 10% increments from zero to full power (100%).
DATA PORT	2400 Bits/second fixed Baud Rate. RS232C compatible.
MATTRESS TILT	0, 5, and 10 degrees
DIMENSIONS AND WEIGHT	
Mattress Height	100 cm (39.4")
Height	188 cm (74")
Width (Side to Side)	72.4 cm (28.5")
Depth (Front to Back)	111.8 cm (44")
Weight	91 kg (200 lbs.)
ENVIRONMENTAL	
Operating Temperature Range	18°C to 30°C (64.4°F to 86°F) ambient
Storage Temperature Range	- 20°C to + 45°C (- 4°F to + 113°F) ambient
Relative Humidity OPerating Range	5% RH to 95% RH, non-condensing
RESUSCITATION (w/AutoBreath™ feature, PN 8140080; w/o AutoBreath™ feature, PN 8140072)	
Wall Supply Pressure	276 kPa (40 psi) to 517 kPa (75 psi)
Cylinder Pressure	20684 kPa (3000 psi) maximum
Cylinder Length (with VHA)	70 cm (27.5")
Cylinder Length (with VHA and spacer) ♦	76 cm (30")
Cylinder Diameter	10 - 12 cm (4 - 5") maximum
Suction Circuit Adjustable Suction Intensity	0 mm Hg (0"H_2O) to150 mm Hg (80"H_2O)
Patient Gas Supply Airway Pressure Limit, Operator Adjustable	4.9kPa (0 to 50 cm H_2O) ± 10%
Patient Gas Supply Fixed Pressure Relief, Factory Set	5.9kPa (60 cm H_2O) ± 10%
Primary Outlet Supply Pressure Limit	15.7 kPa (160.1 cm H_2O) ± 20%

Primary Outlet Flow Range	0 lpm to 15 lpm
Auxiliary Supply Pressure Limit (w/o AutoBreath™ feature)	15.7 kPa (160.1 cm H_2O) ± 10% maximum
Auxiliary Supply Pressure Limit (with AutoBreath™ feature)	15.7 kPa (160.1 cm H_2O) ± 10% maximum
Auxiliary Flow Circuit Flow Range	0 lpm to 15 lpm
Auxiliary Flow Circuit Pressure	15.7 kPa (160.1 cm H_2O) ± 10% maximum
AutoBreath™ feature (Factory Installed Option)	
I/E Ratio	Fixed at 1:2 ± 20%
PEEP Ratio	1.8 ± 0.4 kPa (0 to 18 ± 4 cm H_2O)
Breath Rate	18 to 60 BPM ± 10% of setting
Adjustable Airway Pressure Relief	0 to 4.9 ± 0.5 kPa (0 to 50 ± 5 cm H_2O)
Fixed Maximum Pressure	5.9 kPa ± 10% (60 cm H_2O ± 10%)
Oxygen Consumption	50 lpm maximum
RESUSCITATION (w/AutoBreath™ feature, PN 8140081; w/o AutoBreath™ feature, PN 8140073)	
Wall Supply Pressure	276 kPa (40 psi) to 517 kPa (75 psi)
Cylinder Pressure	20684 kPa (3000 psi) maximum
Cylinder Length (with VHA)	70 cm (27.5")
Cylinder Length (with VHA and spacer)	76 cm (30")
Cylinder Diameter	10 - 12 cm (4 - 5") maximum
Suction Circuit Adjustable Suction Intensity	0 mm Hg (0"H_2O) to150 mm Hg (80"H_2O)
Patient Gas Supply Airway Pressure Limit, Operator Adjustable	4.9kPa (0 to 50 cm H_2O) ± 10%
Patient Gas Supply Fixed Pressure Relief, Factory Set	5.0kPa (50 cm H_2O) ± 20%
Primary Outlet Supply Pressure Limit	15.7 kPa (160.1 cm H_2O) ± 20%

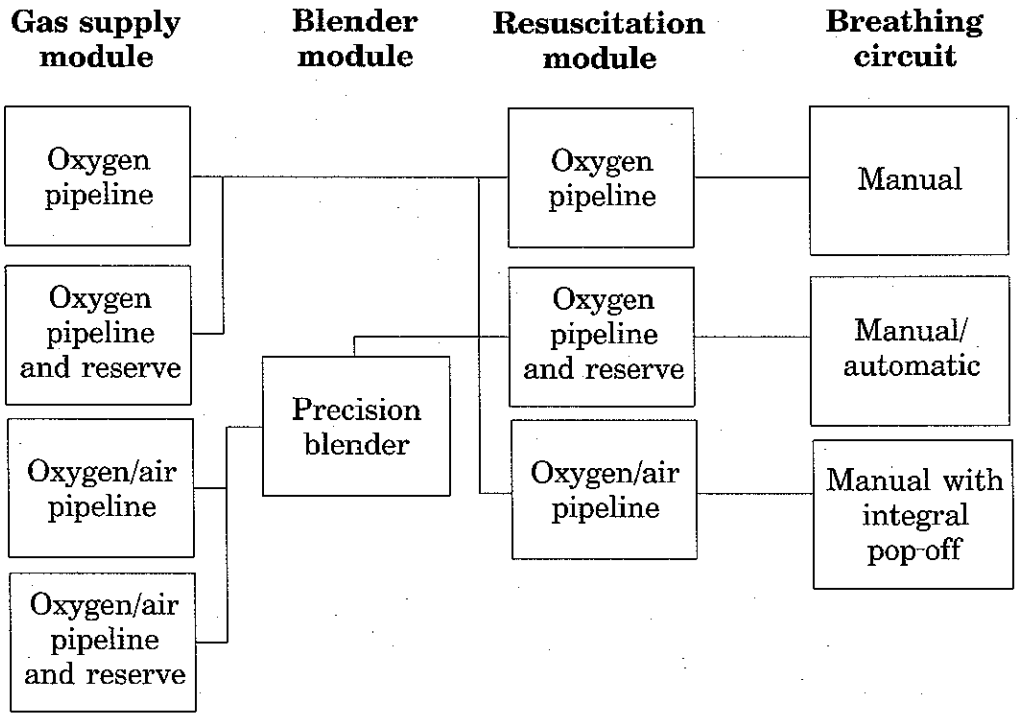
Primary Outlet Flow Range	0 lpm to 15 lpm
Auxiliary Supply Pressure Limit (w/o AutoBreath™ feature)	15.7 kPa (160.1 cm H_2O) ± 10% maximum
Auxiliary Supply Pressure Limit (with AutoBreath™ feature)	4 kPa (40 cm H_2O) ± 10% maximum
Auxiliary Flow Circuit Flow Range	0 lpm to 15 lpm
Auxiliary Flow Circuit Pressure	4 kPa (40 cm H_2O) ± 10% maximum
AutoBreath™ feature (Factory Installed Option)	
I/E Ratio	Fixed at 1:2 ± 20%
PEEP Ratio	0 to 1.8 ± 0.4 kPa (0 to 18 ± 4 cm H_2O)
Breath Rate	18 to 60 BPM ± 10% of setting
Adjustable Airway Pressure Relief	4.9 ± 0.5 kPa (0 to 50 ± 5 cm H_2O)
Fixed Maximum Pressure	5.0 kPa ± 10% (50 cm H_2O ± 10%)
Oxygen Consumption	50 lpm maximum
MONITOR SHELF DIMENSIONS	35.6 cm (14.0") x 30.5 cm (12.0")

- Data Tag Reference 82VHA part numbers:
  8201080 and 8201081
  8201170 and 8201171

Gas Delivery Module

When the blender module is included in the system, the gas delivery module provides 0 lpm to 15 lpm of oxygen/air mixture, as selected by the user (see figure 3.9 on page 10). When **no** blender module is included in the system, the gas delivery module provides 0 lpm to 15 lpm of oxygen, as selected by the user. The flow control is a calibrated, dial-type, flow adjustment.

Figure 3.9: Gas Delivery Module Theory of Operation



m221de107

5.2.2 Resuscitation Calibration

Refer to "5.12 Resuscitation Module Check and Calibration Procedures" on page 5-44.

5.3 DC Power Requirements

Tools required: Calibrated digital voltmeter (Fluke®[1] 8080A or equivalent)

At the specified AC input voltage, verify the following DC voltages at the power and control P.C. board (see table 5.1 on page 5-2).

Table 5.1: DC Power Requirements

DC Output Voltage	Connector and Pin
+5.1V ± 0.05V	J2-2 or J2-3
+12V ± 0.5V	J2-1
-12V ± 0.5V	J2-6
Ground	J2-4

1. Fluke® is a registered trademark of Fluke Corporation.

Error Number	Explanation	Possible Corrective Action
Error #21	Ambient temperature probe #1/ Ambient temperature probe error, > 0.4°C	• Check for a faulty skin temperature probe. Ensure that the skin temperature probe is **not** in contact with materials. • Adjust the skin temperature probe sensor (refer to "5.2.1 Adjustments" on page 5-1). • Replace PCB1.

5.11.7 Removing and Replacing the Quartz Heater Element

Tools required: Clean cloth gloves
Rubbing alcohol
Clean cloth or towel
Small screwdriver or trim potentiometer adjustment tool
Digital voltmeter (DVM)

Removal

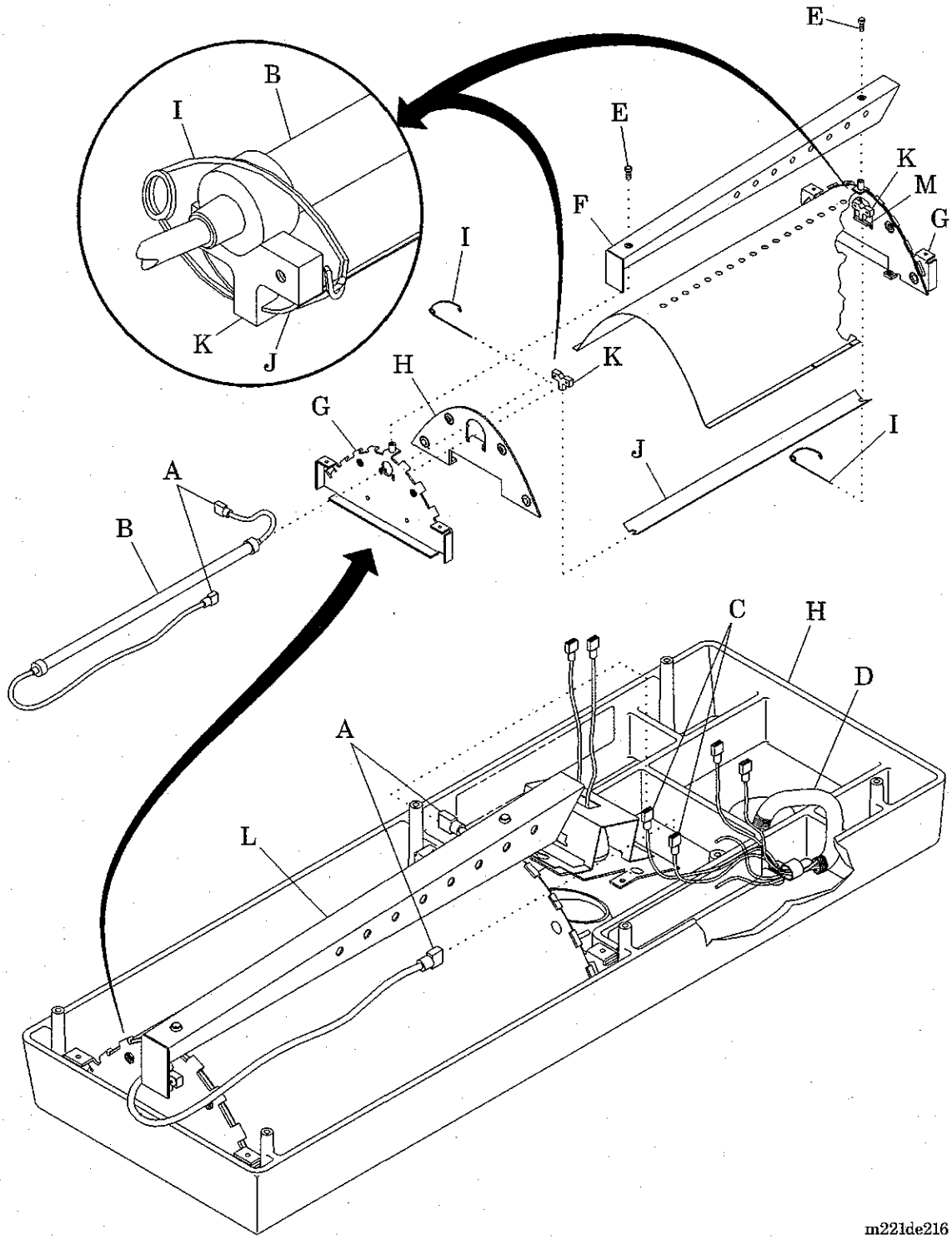
SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

1. Unplug the unit from its power source.

WARNING:
The heater element may be hot enough to cause burns. Before accessing the warmer head, allow 30 minutes for the unit to sufficiently cool. Failure to do so could result in personal injury.

2. Allow 30 minutes for the unit to cool.
3. Remove the top cover from the warmer head (refer to section 5.11.10).
4. Disconnect the leads (A) of the quartz heater element (B) from the red and orange wire connectors (C) of the electrical module-to-warmer head cable assembly (D) (see Quartz Heater Element on page 15).
5. Remove the two screws (E) that secure the heat shield (F) to the two end plates (G).
6. Remove the heat shield (F) from the two end plates (G).
7. If the unit is equipped with a heater grill, remove the heater grill from the unit (refer to section 5.11.9).

Quartz Heater Element



8. From underneath the warmer head, perform the following:
   a. Unfasten the two retaining springs (I), and remove them and the secondary reflector (J) from the mounting brackets (K).

CAUTION:
Do **not** touch the quartz heater element with bare hands. Equipment damage could occur.

   b. Before touching the quartz heater element (B), put on clean cloth gloves.
   c. Slide the quartz heater element (B) through the front end plate (G) and the front parabola bracket (H).

Replacement

CAUTION:
Do **not** touch the quartz heater element with bare hands. Equipment damage could occur.

1. Before touching the quartz heater element (B), put on clean cloth gloves.

CAUTION:
To avoid improper heating, do **not** pull the metal ends away from the quartz heater element.

2. Orient the quartz heater element (B) so that its **shorter** lead (A) routes through the rear of the heater element (L), and slide it through the front end plate (G) and the front parabola bracket (H) until its ceramic ends rest on the V-notches of the two mounting brackets (K). Do **not** pull the metal ends away from the quartz heater element (B).

3. Connect the leads (A) of the quartz heater element (B) to the red and orange connectors (C) of the electrical module-to-warmer head cable assembly (D).

WARNING:
Do **not** adjust the mounting brackets. Adjusting the mounting brackets disturbs the alignment of the quartz heater element. Personal injury or equipment damage could occur.

4. Ensure that the ceramic ends of the quartz heater element (B) rest on the V-notches of the two mounting brackets (K). If necessary, adjust the position of the quartz heater element (B). Do **not** adjust the two mounting brackets (K).

5. Align the cut-out portions at either end of the secondary reflector (J) with the lower T-portions of the two mounting brackets (K), and rest each end on the metal flange (M) just below each mounting bracket (K) on the parabola brackets (H).

6. Lift one end of the secondary reflector (J) above the hole in the lower T-portion of the mounting bracket (K), and hold it in place.

WARNING:
Do **not** adjust the mounting brackets. Adjusting the mounting brackets disturbs the alignment of the quartz heater element. Personal injury or equipment damage could occur.

7. Place the lower half of the retaining spring (I) through the hole in the lower T-portion of the mounting bracket (K). Do **not** adjust the mounting bracket (K).

CAUTION:
Ensure that the retaining spring does **not** rest on the metal tip of the quartz heater element. Equipment damage could occur.

8. Place the top half of the retaining spring (I) around the ceramic end of the quartz heater element (B), and fasten the retaining spring (I). Ensure that the retaining spring (I) does **not** rest on the metal tip of the quartz heater element (B).

9. Lift the other end of the secondary reflector (J) above the hole in the lower T-portion of the second mounting bracket (K), and hold it in place.

WARNING:
Do **not** adjust the mounting brackets. Adjusting the mounting brackets disturbs the alignment of the quartz heater element. Personal injury or equipment damage could occur.

10. Place the lower half of the second retaining spring (I) through the hole in the lower T-portion of the second mounting bracket (K). Do **not** adjust the mounting bracket (K).

CAUTION:
Ensure that the retaining spring does **not** rest on the metal tip of the quartz heater element. Equipment damage could occur.

11. Place the top half of the second retaining spring (I) around the ceramic end of the quartz heater element (B), and fasten the second retaining spring (I). Ensure that the retaining spring (I) does **not** rest on the metal tip of the quartz heater element (B).

CAUTION:
If fingerprints are on the quartz heater element, remove them with rubbing alcohol before activating the unit. Otherwise, equipment damage could occur.

12. Inspect the quartz heater element (B). If fingerprints are present on the quartz heater element (B), use rubbing alcohol and a clean cloth or towel to remove them.

13. If the unit is equipped with a heater grill, install the heater grill on the unit (refer to procedure 5.11.9).

14. Align the heat shield (F) with the two end plates (G), and install the two screws (E) to secure the heat shield (F) to the two end plates (G).

15. Install the top cover on the warmer head (refer to section 5.11.10).

16. Adjust the heater voltage sensor. Refer to "Adjustment" on page 24.

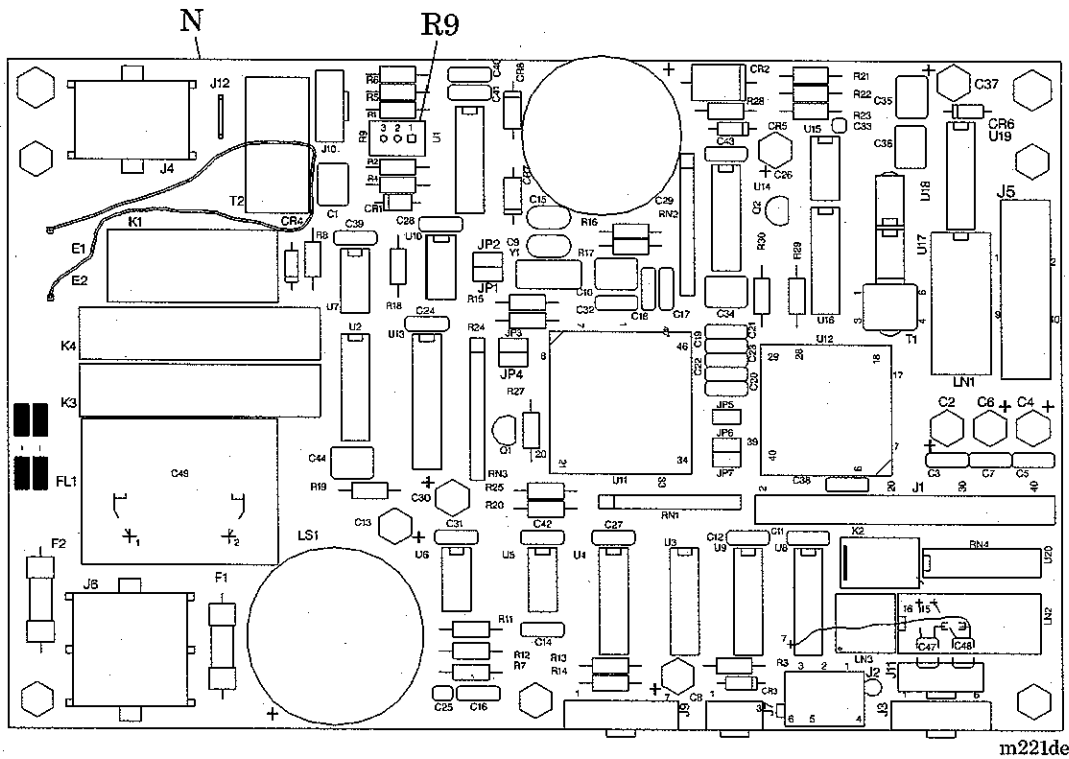
Adjustment

Heater Voltage Sensor

1. Perform "Diagnostic Test #6—AC Line Voltage Display" on page 5-13 (refer to section 5.9).

2. Using a digital voltmeter (DVM) , measure the input AC line voltage on the power and control P.C. board (N) (see Power and Control P.C. Board on page 19).

Power and Control P.C. Board



3. Using a small screwdriver or a trim potentiometer adjustment tool, adjust R9 until the value shown on the **Baby Temperature** display equals the measured value on the DVM.

4. To ensure proper operation of the Resuscitaire® Birthing Room Warmer, perform the "Operational Checkout Procedure—Controller" on page 2-3.

5.11.9 Removing and Replacing the Heater Grill

Tools required: Screwdriver

Removal

SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

1. Unplug the unit from its power source.

WARNING:
The heater element may be hot enough to cause burns. Before accessing the warmer head, allow 30 minutes for the unit to sufficiently cool. Failure to do so could result in personal injury.

2. Allow 30 minutes for the unit to cool.

3. Perform one of the following:

   On a unit equipped with P/N 81 990 65 (Upgrade kit, heater grill), perform the following:

   a. Hold the shroud grill (A) in position with one hand, and loosen the four captive quarter-turn fasteners (B) that secure the shroud grill (A) to the two grill brackets (C) (see Heater Grill on page 21) (see view D).

   b. Remove the two grill straps (E) from the two grill brackets (C).

   c. Remove the shroud grill (A) from the two grill brackets (C).

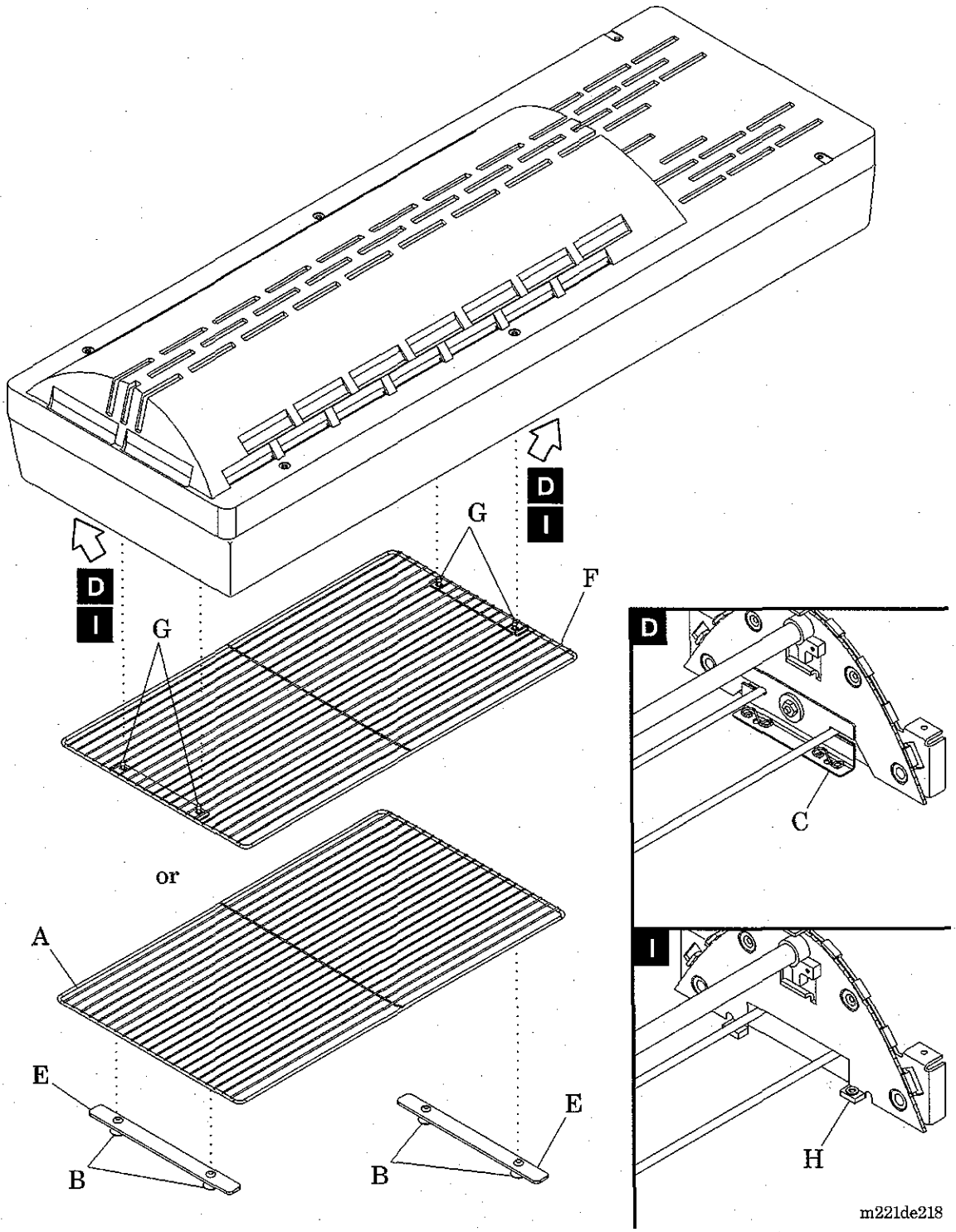
   or

   On a unit equipped with P/N 81 003 04 (Grill, guard), perform the following:

   a. Hold the guard grill (F) in position with one hand, and undo the four screws (G) that secure the guard grill (F) to the two parabola brackets (H) (see view I).

   b. Remove the guard grill (F) from the two parabola brackets (H).

Heater Grill



Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the Resuscitaire® Birthing Room Warmer, perform the "Operational Checkout Procedure—Controller" on page 2-3.

5.11.10 Removing and Replacing the Warmer Head Top Cover

Tools required: Phillips head screwdriver

Removal

SHOCK HAZARD:
Unplug the unit from its power source. Failure to do so could result in personal injury or equipment damage.

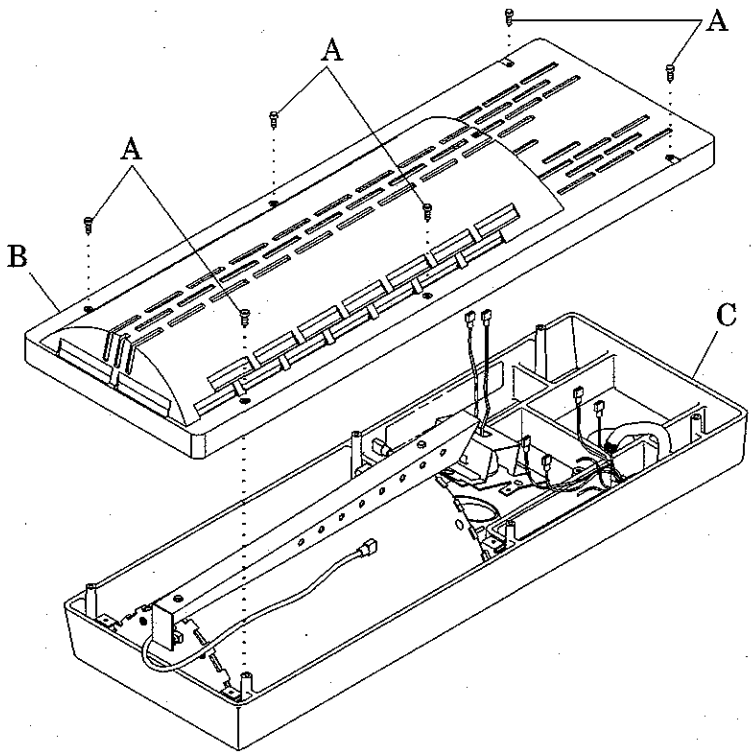
1. Unplug the unit from its power source.

WARNING:
The heater element may be hot enough to cause burns. Before accessing the warmer head, allow 30 minutes for the unit to sufficiently cool. Failure to do so could result in personal injury.

2. Allow 30 minutes for the unit to cool.

3. Remove the six screws (A) that secure the warmer head top cover (B) to the warmer head (C) (see Warmer Head Top Cover on page 24). **Retain** the six screws (A).

Warmer Head Top Cover



m221de219

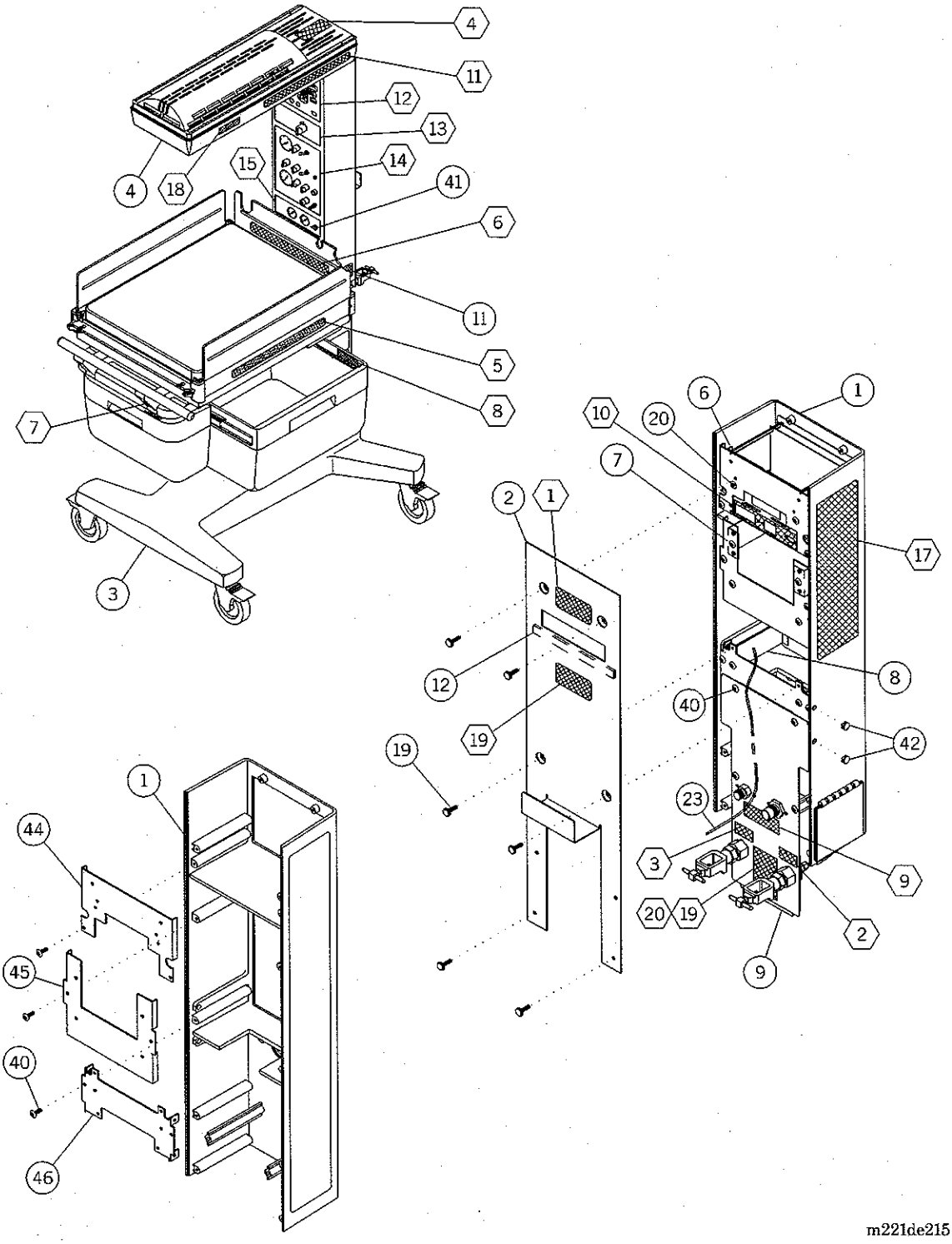
4. Lift the warmer head top cover (B) away from the warmer head (C).

Replacement

1. Perform the removal procedure in reverse order.

2. To ensure proper operation of the Resuscitaire® Birthing Room Warmer, perform the "Operational Checkout Procedure—Controller" on page 2-3.

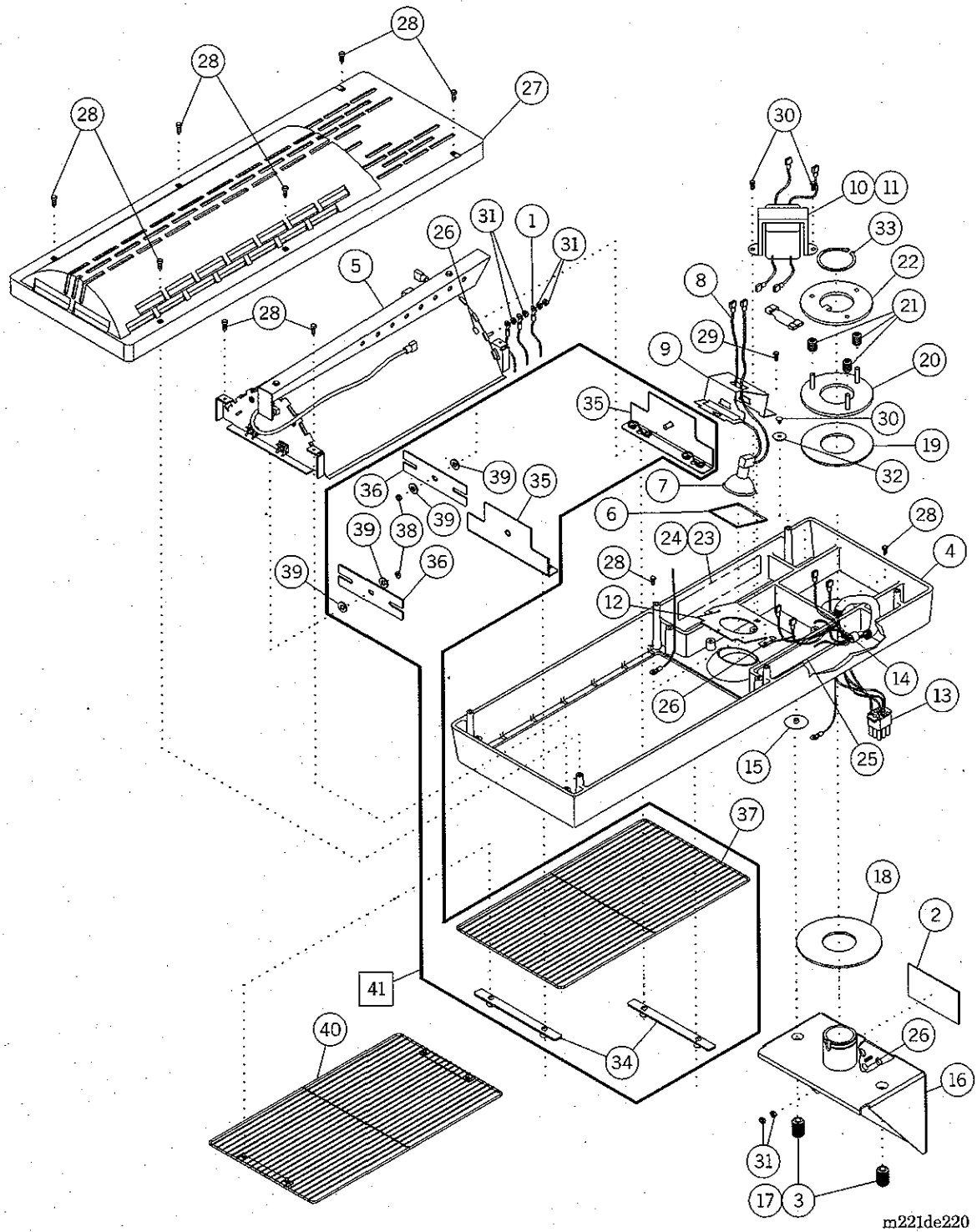
Figure 6.1E: Parts Location Diagram, Resuscitaire® Radiant Warmer Assembly VHA



m221de215

Warmer Head Assembly

Warmer Head Assembly



Warmer Head Assembly

Item Number	Part Number	Quantity	Description
1	81 020 41	1	Wire, ground, #6 ring, 4.00" long
2	Reference only	1	Label, data tag, 1.63" x 3.00"
3	99 901 77	As required	Loctite®[a] adhesive #242
4	81 020 10	1	Chassis, shroud
5	Reference only	1	Heater subassembly
6	78 260 36	1	Window, glass, square
7	17 807 41	1	Lamp, incandescent, quartz-halogen, 12V, 50 W
8	78 258 70	1	Connector assembly, examination light
9	78 260 25	1	Bracket, lamp mounting
10	78 265 95	1	Transformer assembly, examination light, 120V
11	78 265 96	1	Transformer assembly, examination light, 240V
12	81 020 28	1	Bracket, lamp
13	81 020 30	1	Cable assembly, electrical module to warmer head
14	17 725 64	2	Clamp, cable, loop-type, nylon, 0.375" inside diameter
15	81 200 19	2	Keeper, ball plunger
16	81 020 11	1	Bracket, heater head pivot
17	81 200 17	2	Ball plunger, 5/8"-11 thread
18	81 020 40	1	Washer, flat, 2.02" inside diameter, 4¾" outside diameter, polyethylene
19	81 200 15	1	Washer, thrust, 2.02" inside diameter, 4¼" outside diameter
20	81 200 22	1	Washer, flat, bottom, with studs, 4¼" outside diameter
21	81 200 13	3	Spring, compression, 0.48" outside diameter, 0.06" x 0.09" wide, 1" long
22	81 200 18	1	Washer, flat, top, 2.001" inside diameter, 4¼" outside diameter
23	81 200 34	1	Label, heater replacement, 120V

a. Loctite® is a registered trademark of Loctite Corporation.

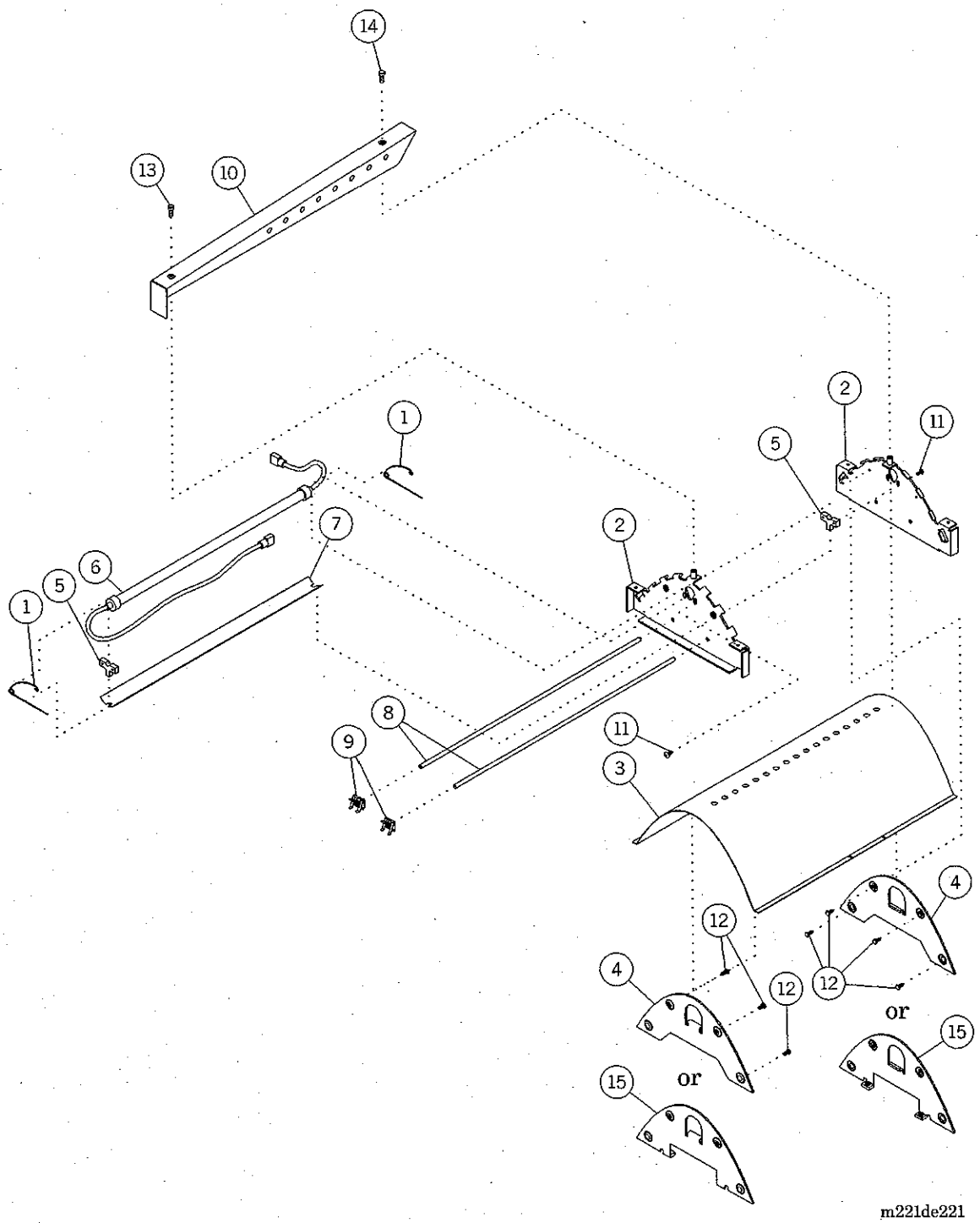
Item Number	Part Number	Quantity	Description
24	81 200 35	1	Label, heater replacement, 220V-240V
25	81 200 33	1	Label, lamp replacement, English/ Spanish/French/German/Italian
26	68 212 00	3	Label, ground symbol, protective
27	81 020 26	1	Cover, top
28	99 023 51	14	Screw, #6-32 x 3/8", truss, phillips, stainless steel, Nylok®[a]
29	99 022 83	2	Screw, #6-32 x ¼", pan, phillips, stainless steel, sems external
30	99 030 76	4	Screw, #8-32 x ¼", truss, phillips, stainless steel, Nylok®
31	99 105 34	6	Nut, hex, #6-32, keps, steel, zinc-plated
32	99 123 32	2	Washer, flat, 0.19" inside diameter, ¾" outside diameter, 0.06" thick, steel, zinc-plated
33	99 187 51	1	Ring, retaining, external, steel
34	81 003 03	2	Strap, grill (for use with units equipped with P/N 81 990 65 (Upgrade kit, heater grill) only)
35	81 003 01	2	Bracket, grill (for use with units equipped with P/N 81 990 65 (Upgrade kit, heater grill) only)
36	81 003 02	2	Plate, grill (for use with units equipped with P/N 81 990 65 (Upgrade kit, heater grill) only)
37	81 003 00	1	Grill, shroud (for use with units equipped with P/N 81 990 65 (Upgrade kit, heater grill) only)
38	99 106 32	2	Nut, hex, #8-32, keps, steel, zinc-plated (for use with units equipped with P/N 81 990 65 (Upgrade kit, heater grill) only)

a. Nylok® is a registered trademark of Nylok Fastener Corporation.

Item Number	Part Number	Quantity	Description
39	99 123 69	4	Washer, flat, 0.200" inside diameter, ¾" outside diameter, 0.062" thick, stainless steel (for use with units equipped with P/N 81 990 65 (Upgrade kit, heater grill) only)
40	81 003 04	1	Grill, guard
41	81 990 65	1	Upgrade kit, heater grill

Heater Subassembly

Heater Subassembly



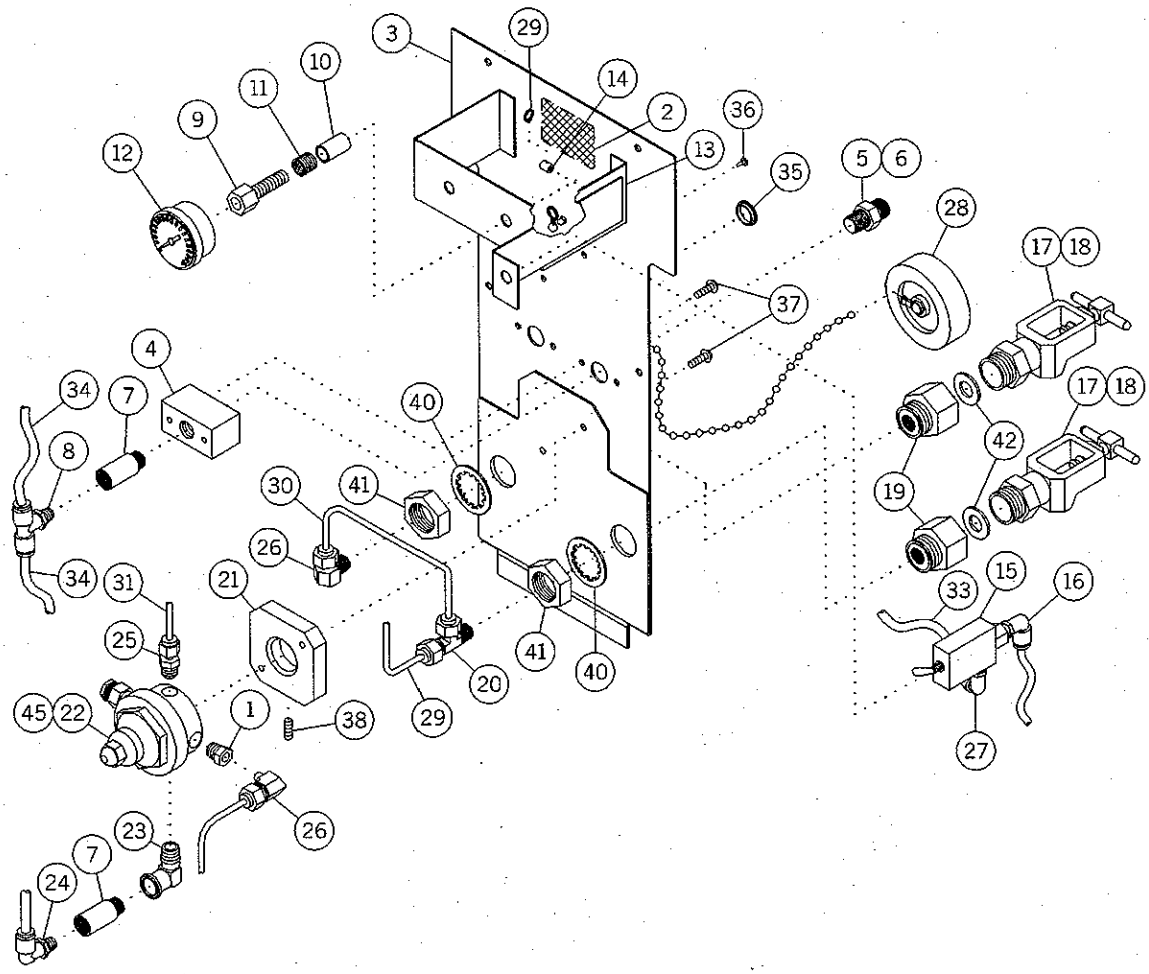
Heater Subassembly

Item Number	Part Number	Quantity	Description
1	81 200 43	2	Spring, retaining
2	81 020 27	2	End plate, main reflector
3	81 200 08	1	Reflector, main
4	Reference only	2	Bracket, parabola (for use with units equipped with P/N 81 990 65 (Upgrade kit, heater grill) only)
5	81 200 42	2	Bracket, heater mounting
6	81 990 50	1	Heater replacement kit, 120V
7	81 900 70	1	Secondary reflector replacement kit
8	81 200 07	2	Rod, heater guard
9	81 200 29	4	Clip, retaining, 3/16" shaft
10	81 020 29	1	Heat shield
11	99 022 83	4	Screw, #6-32 x ¼", pan, phillips, stainless steel, sems external
12	99 023 31	8	Screw, #6-32 x 3/8", truss, phillips, stainless steel
13	99 023 51	1	Screw, #6-32 x 3/8", truss, phillips, stainless steel, Nylok®[a]
14	99 025 23	1	Screw, #6-32 x 1.00", truss, phillips, stainless steel, Nylok®
15	Reference only	2	Bracket, parabola (for use with units equipped with P/N 81 003 04 (Grill, guard) only)

a. Nylok® is a registered trademark of Nylok Fastener Corporation.

Oxygen Pipeline with Oxygen Cylinder (Pin-Index) Gas Supply Assembly—DISS (81 500 80-R), NIST (81 500 81-R), and Low-Pressure (81 501 94-R)

Figure 6.10: Oxygen Pipeline with Oxygen Cylinder (Pin-Index) Gas Supply Assembly—DISS (81 500 80-R), NIST (81 500 81-R), and Low-Pressure (81 501 94-R)



m221de203

Table 6.10: Oxygen Pipeline with Oxygen Cylinder (Pin-Index) Gas Supply Assembly—DISS (81 500 80-R), NIST (81 500 81-R), and Low-Pressure (81 501 94-R)

Item Number	Part Number	Quantity	Description
1	68 504 09	1	Bushing, ¼" National Pipe Thread (NPT)—1/8" NPT, brass, HpO_2
2	81 000 38	1	Label, data tag, 1.81" square
3	81 500 01	1	Chassis, gas supply, with cylinder holes
4	81 500 06	1	Manifold, pipeline
5	68 239 27	4	Connector, male, ¼" NPT—oxygen DISS (81 500 80-R only)
6	68 239 36	4	Adapter, ¼" NPT—oxygen NIST female (81 500 81-R only)
7	81 500 43	2	Check valve, ¼" male in, female out
8	81 500 21	1	Tee, ¼" outside diameter tubing, ¼" NPT male branch
9	81 500 32	1	Connector, bulkhead, 0.12" tube swage—1/8" NPT female, HpO_2
10	81 500 03	1	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.48" long, stainless steel
11	81 500 08	1	Spring, compression, 0.48" outside diameter, 0.045" wide, 0.875" long
12	81 500 36	1	Gauge, pressure, 0 psi-4000 psi, HpO_2
13	81 500 02	1	Bracket, pneumatic valve
14	99 116 91	2	Standoff, #6-32 inside diameter, ¼" outside diameter, ¼" long, brass
15	81 500 40	1	Valve, control, mini three-way
16	81 500 22	1	Elbow, ¼" outside diameter tubing—1/8" NPT male
17	81 501 17	2	Yoke, oxygen, for check valve, HpO_2
18	78 422 41	2	Check valve, HpO_2
19	78 440 15	2	Adapter, yoke, male to female, HpO_2
20	81 500 33	1	Tee, 0.19" base—1/8" NPT—0.19" tube, HpO_2
21	81 500 05	1	Block, mounting, pressure regulator

Item Number	Part Number	Quantity	Description
22	81 501 69	1	Regulator, 65 psi/pressure relief, HpO_2
23	68 238 16	1	Elbow, street, 90°, ¼", male/female
24	81 500 23	1	Elbow, ¼" outside diameter tubing—¼" NPT, male
25	81 500 27	1	Connector, 0.12" tubing swage—¼" NPT male, brass, HpO_2
26	81 500 30	2	Elbow, 0.19" tube swage—1/8" NPT male, brass, HpO_2
27	81 500 24	1	Elbow, 0.312" outside diameter tubing—1/8" NPT male
28	75 407 38	1	Handle, valve, removable with chain
29	81 501 08	1	Tubing, formed, 3/16" outside diameter, HpO_2
30	81 501 05	1	Tubing, formed, 3/16" outside diameter, HpO_2
31	81 501 33	1	Tubing, copper, 0.12" outside diameter, 12" long, HpO_2
32	81 501 11 *	1	Tubing polyethylene, ¼" outside diameter, 0.17" inside diameter, 7" long
33	81 501 38	1	Tubing polyethylene, 0.187" inside diameter, 0.312" outside diameter, 11" long
34	81 501 14	1	Tubing polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
35	81 500 42	1	Plug button, nylon, 0.62" hole
36	68 602 02	4	Plug, panel fastening, 0.182"-0.192", Canoe®[a]
37	99 031 99	4	Screw, #8-32 x ½", truss phillips Nylok®[b] stainless steel
38	99 042 00	1	Screw, #10-32 x ½", sems external, socket, stainless steel, cap

a.Canoe® is a trademark of Illinois Tool Works, Inc.
b.Nylok® is a registered trademark of Nylok Fastener Corporation.

* Item not shown.

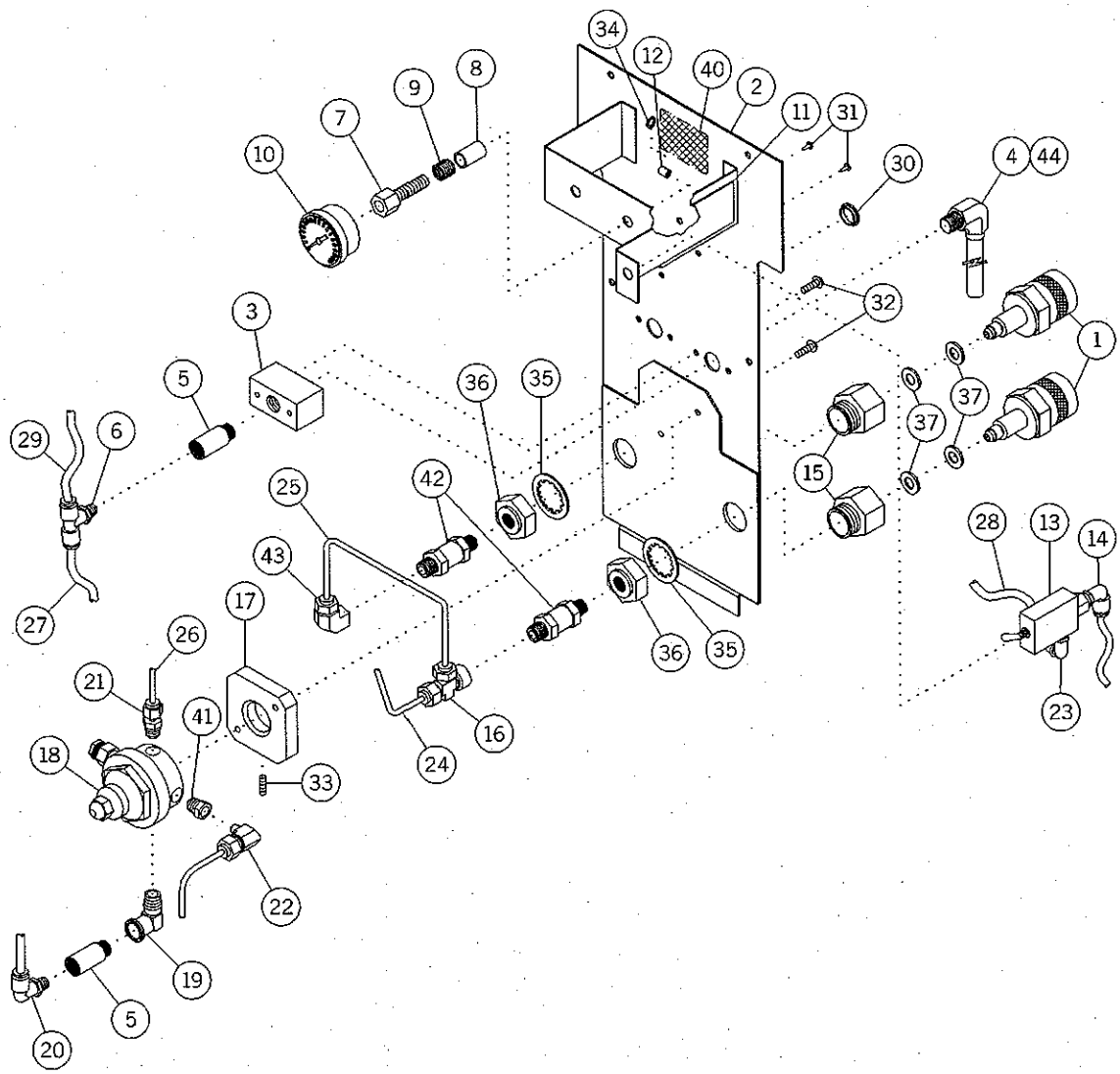
Item Number	Part Number	Quantity	Description
39	99 181 48 *	2	Ring, retaining, push-on, stainless steel, 0.010" thick
40	99 129 85	2	Washer, lock, internal, 7/8", steel, cadmium-plated
41	99 114 50	2	Nut, hex, jam, 7/8"-14, zinc-plated
42	78 423 30	2	Washer, flat, 0.25" inside diameter, 0.81" outside diameter, HpO_2, 0.12" nylon
43	99 900 26 *	As required	Tape, pipe junction seal, Teflon®[a], ½"
44	99 901 38 *	As required	Loctite®[b] screwlock #222
45	81 501 77	1	Regulator, 45 psi/pressure relief, HpO_2 (81 501 94-R only)

a.Teflon® is a registered trademark of E. I. du Pont and de Nemours and Company.
b.Loctite® is a registered trademark of Loctite Corporation.

* Item not shown.

Gas Supply Assembly with Oxygen Reserve, Deutsche Industrie Norm (DIN) Cylinder Fittings—White Hose (81 500 83-R) or Green Hose (81 501 80)

Figure 6.11: Gas Supply Assembly with Oxygen Reserve, Deutsche Industrie Norm (DIN) Cylinder Fittings—White Hose (81 500 83-R) or Green Hose (81 501 80)



m221de211

Table 6.11: Gas Supply Assembly with Oxygen Reserve, Deutsche Industrie Norm (DIN) Cylinder Fittings—White Hose (81 500 83-R) or Green Hose (81 501 80)

Item Number	Part Number	Quantity	Description
1	81 501 22	2	Connector, DIN, oxygen cylinder, HpO_2
2	81 500 01	1	Chassis, gas supply, with cylinder holes
3	81 500 06	1	Manifold, pipeline
4	81 501 53	1	Hose assembly, oxygen, white, 10' (81 500 83-R only)
5	81 500 43	2	Check valve, ¼" National Pipe Thread (NPT) male in, female out
6	81 500 21	1	Tee, ¼" outside diameter tubing, ¼" NPT male branch
7	81 500 32	1	Connector, bulkhead, 0.12" tubing swage—1/8" NPT female, HpO_2
8	81 500 03	1	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.48" long, stainless steel
9	81 500 08	1	Spring, compression, 0.480" outside diameter, 0.045" wide, 0.875" long
10	81 500 36	1	Gauge, pressure, 0 psi-4000 psi, HpO_2
11	81 500 02	1	Bracket, pneumatic valve
12	99 116 91	2	Standoff, #6-32 inside diameter, ¼" outside diameter, ¼" long, brass
13	81 500 40	1	Valve, control, mini three-way
14	81 500 22	1	Elbow, ¼" outside diameter tubing—1/8" NPT male
15	81 500 34	2	Adapter, high pressure cylinder, HpO_2
16	81 501 72	1	Tee, 0.19" tubing swage—1/8" NPT female—0.19" tube HpO_2
17	81 500 05	1	Block, mounting, pressure regulator
18	81 501 69	1	Regulator, 65 psi/pressure relief, HpO_2
19	81 500 37	1	Elbow, street, 90°, ¼" NPT, brass
20	81 500 23	1	Elbow, ¼" outside diameter tubing—¼" NPT male

Item Number	Part Number	Quantity	Description
21	81 500 27	1	Connector, 0.12" tubing swage—¼" NPT male, brass, HpO_2
22	81 500 30	1	Elbow, 0.19" tube swage—1/8" NPT brass, HpO_2
23	81 500 24	1	Elbow, 0.312" outside diameter tubing—1/8" NPT male
24	81 501 08	1	Tubing, formed, 3/16" outside diameter, HpO_2
25	81 501 05	1	Tubing, formed, 3/16" outside diameter, HpO_2
26	81 501 33	1	Tubing, copper, 0.12" outside diameter, 12.00" long, HpO_2
27	81 501 11	1	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 7.00" long
28	81 501 38	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 11.00" long
29	81 501 14	11	Tubing polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
30	81 500 42	1	Plug button, nylon, 0.62" hole
31	68 602 02	10	Plug, panel fastening, 0.182"-0.192", Canoe®[a]
32	99 031 99	4	Screw, #8-32 x ½", truss, phillips, stainless steel, Nylok®[b]
33	99 042 00	1	Screw, #10-32 x ½", sems external, socket, stainless steel, cap
34	99 181 48	2	Ring, retaining, push-on, stainless steel, 0.01" thick
35	99 129 85	2	Washer, lock, internal, 7/8", steel, cadmium-plated
36	99 114 50	2	Nut, hex, jam, 7/8"-14, steel, zinc-plated

a.Canoe® is a trademark of Illinois Tool Works, Inc.
b.Nylok® is a registered trademark of Nylok Fastener Corporation.

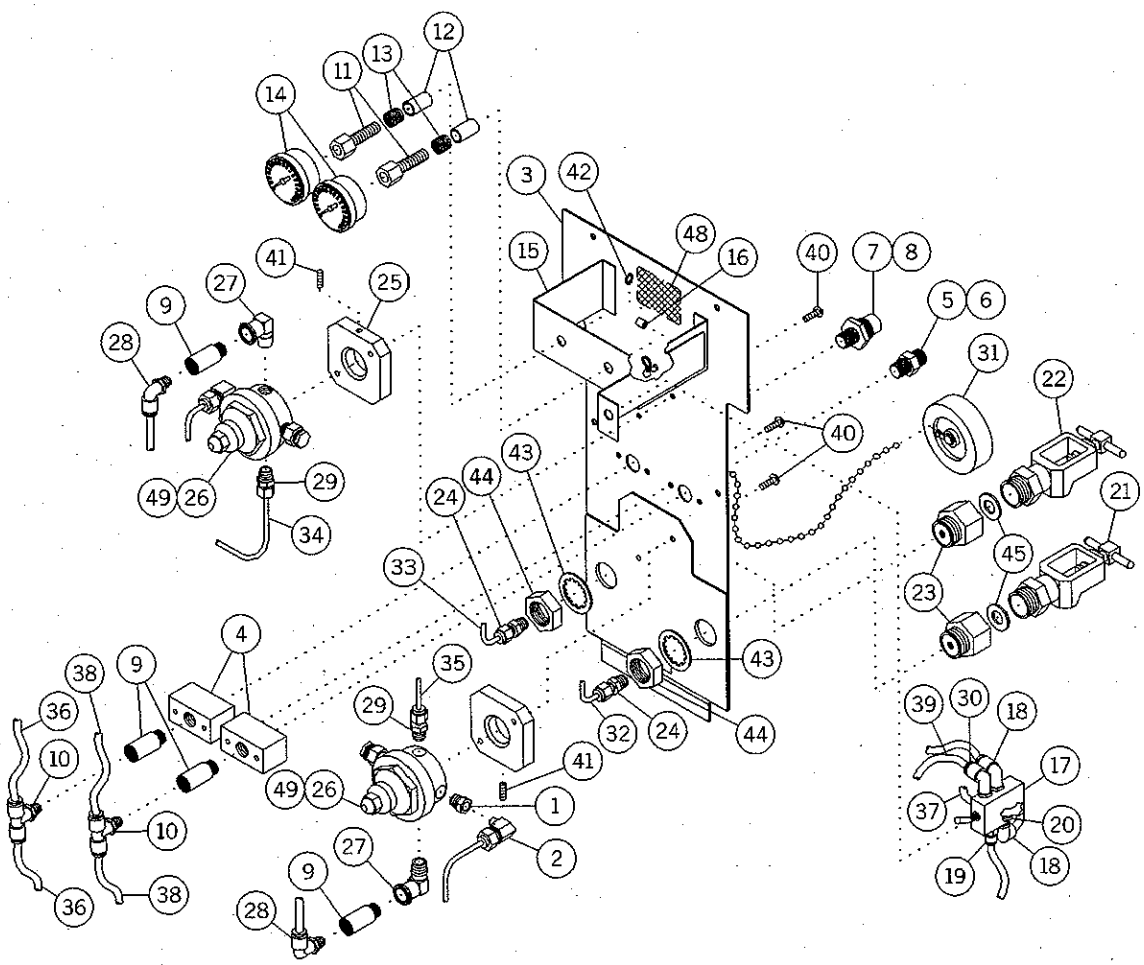
Item Number	Part Number	Quantity	Description
37	99 123 70	4	Washer, flat, 0.19" inside diameter, 0.56" outside diameter, 0.06" nylon, HpO_2
38	99 900 26 *	As required	Tape, pipe junction seal, Teflon®[a], ½"
39	99 901 38 *	As required	Loctite®[b] screwlock #222
40	Reference only	1	Label, data tag, 1.81" square
41	68 504 09	1	Bushing, ¼" NPT—1/8" NPT, brass, HpO_2
42	78 422 41	2	Check valve, HpO_2
43	81 501 71	1	Elbow, 90°, 0.19" tubing—1/8" NPT female, brass, HpO_2
44	81 501 55	1	Hose assembly, oxygen, green, 10' (81 501 80 only)

a.Teflon® is a registered trademark of E. I. du Pont and de Nemours and Company.
b.Loctite® is a registered trademark of Loctite Corporation.

* Item not shown.

Oxygen/Air Pipeline with Pin-Indexed Oxygen/Air Cylinder Gas Supply Assembly—DISS (81 500 85-R), NIST (81 500 86-R), and Low-Pressure (81 501 95-R)

Figure 6.12: Oxygen/Air Pipeline with Pin-Indexed Oxygen/Air Cylinder Gas Supply Assembly—DISS (81 500 85-R), NIST (81 500 86-R), and Low-Pressure (81 501 95-R)



m221de204

Table 6.12: Oxygen/Air Pipeline with Pin-Indexed Oxygen/Air Cylinder Gas Supply Assembly—DISS (81 500 85-R), NIST (81 500 86-R), and Low-Pressure (81 501 95-R)

Item Number	Part Number	Quantity	Description
1	68 504 09	2	Bushing, ¼" National Pipe Thread (NPT)—1/8" NPT, brass, HpO_2
2	81 500 30	2	Elbow, 0.19" tube swage—1/8" NPT brass, HpO_2
3	81 500 01	1	Chassis, gas supply, with cylinder holes
4	81 500 06	2	Manifold, pipeline
5	68 239 27	1	Connector, male, ¼" NPT—oxygen DISS (81 500 85-R only)
6	68 239 36	1	Adapter, ¼" NPT—oxygen NIST female (81 500 86-R only)
7	81 500 38	1	Connector, medical air male—¼" NPT male (81 500 85-R only)
8	81 500 47	1	Adapter, ¼" NPT male—air NIST female (81 500 86-R only)
9	81 500 43	4	Check valve, ¼" male in, female out
10	81 500 21	2	Tee, ¼" outside diameter tubing, ¼" NPT male branch
11	81 500 32	2	Connector, bulkhead, 0.12" tube swage—1/8" NPT female, HpO_2
12	81 500 03	2	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.48" long, stainless steel
13	81 500 08	2	Spring, compression, 0.48" outer diameter, 0.045" wide, 0.875" long
14	81 500 36	2	Gauge, pressure, 0 psi-4000 psi, HpO_2
15	81 500 02	1	Bracket, pneumatic valve
16	99 116 91	2	Standoff #6-32 inside diameter, ¼" outside diameter, ¼" long, brass
17	81 500 41	1	Valve, control, mini five-way
18	81 500 22	2	Elbow, ¼" outside diameter tubing—1/8" NPT male
19	81 500 25	1	Connector, ¼" tubing—1/8" NPT male

Item Number	Part Number	Quantity	Description
20	78 456 08	1	Pipe plug, 1/8" NPT, hex socket head, brass
21	81 900 73	1	Replacement kit, oxygen yoke without check valve
22	81 900 74	1	Replacement kit, air yoke
23	78 440 15	2	Adapter, yoke, male to female, HpO_2
24	81 500 28	2	Connector, 0.19" tubing swage—¼" NPT brass, HpO_2
25	81 500 05	2	Block, mounting, pressure regulator
26	81 501 69	2	Regulator, 65 psi/pressure relief, HpO_2
27	81 500 37	2	Elbow, street, 90°, ¼" NPT brass
28	81 500 23	2	Elbow, ¼" outside diameter tubing—¼" NPT, male
29	81 500 27	2	Connector, 0.12" tubing swage—¼" NPT male, brass, HpO_2
30	81 500 24	1	Elbow, 0.312" outside diameter tubing—1/8" NPT male
31	75 407 38	1	Handle, valve, removable with chain
32	81 501 06	1	Tubing, formed, 3/16" outside diameter, HpO_2
33	81 501 07	1	Tubing, formed, 3/16" outside diameter, HpO_2
34	81 501 34	1	Tubing, copper, 0.12" outside diameter, 14" long, HpO_2
35	81 501 33	1	Tubing, copper, 0.12" outside diameter, 12" long, HpO_2
36	81 501 12	2	Tubing polyethylene, ¼" outside diameter, 0.17" inside diameter, 12" long
37	81 501 13	1	Tubing, ¼" outside diameter, 0.17" inside diameter, 21" long
38	81 501 14	2	Tubing polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
39	81 501 37	1	Tubing polyethylene, 0.187" inside diameter, 0.312" outside diameter, 7½" long

Item Number	Part Number	Quantity	Description
40	99 031 99	8	Screw, #8-32 x ½", truss, phillips, stainless steel, Nylok®[a]
41	99 042 00	2	Screw, #10-32 x ½", sems external, socket, stainless steel, cap
42	99 181 48	2	Ring, retaining, push-on, stainless steel, 0.01" thick
43	99 129 85	2	Washer, lock, internal, 7/8", steel, cadmium-plated
44	99 114 50	2	Nut, hex, jam, 7/8"-14, zinc-plated
45	78 423 30	2	Washer, flat, 0.25" inside diameter, 0.81" outside diameter, HpO_2, 0.12" nylon
46	99 900 26 *	As required	Tape, pipe junction seal, Teflon®[b], ½"
47	99 901 38 *	As required	Loctite®[c] screwlock #222
48	81 000 38	1	Label, data tag, 1.81" square
49	81 501 77	2	Regulator, 45 psi/pressure relief, HpO_2 (81 501 95-R only)

a.Nylok® is a registered trademark of Nylok Fastener Corporation.
b.Teflon® is a registered trademark of E. I. du Pont and de Nemours and Company.
c.Loctite® is a registered trademark of Loctite Corporation.

* Item not shown.

Gas Supply Assembly with Oxygen/Air Reserves and Deutsche Industrie Norm (DIN) Cylinder Fittings—Blue/Green and Yellow

Hoses (81 500 88-R/90-R) or Blue/White and Black Hoses (81 501 91-R/92-R)

Figure 6.13: Gas Supply Assembly with Oxygen/Air Reserves and Deutsche Industrie Norm (DIN) Cylinder Fittings—Blue/Green and Yellow Hoses (81 500 88-R/90-R) or Blue/White and Black Hoses (81 501 91-R/92-R)

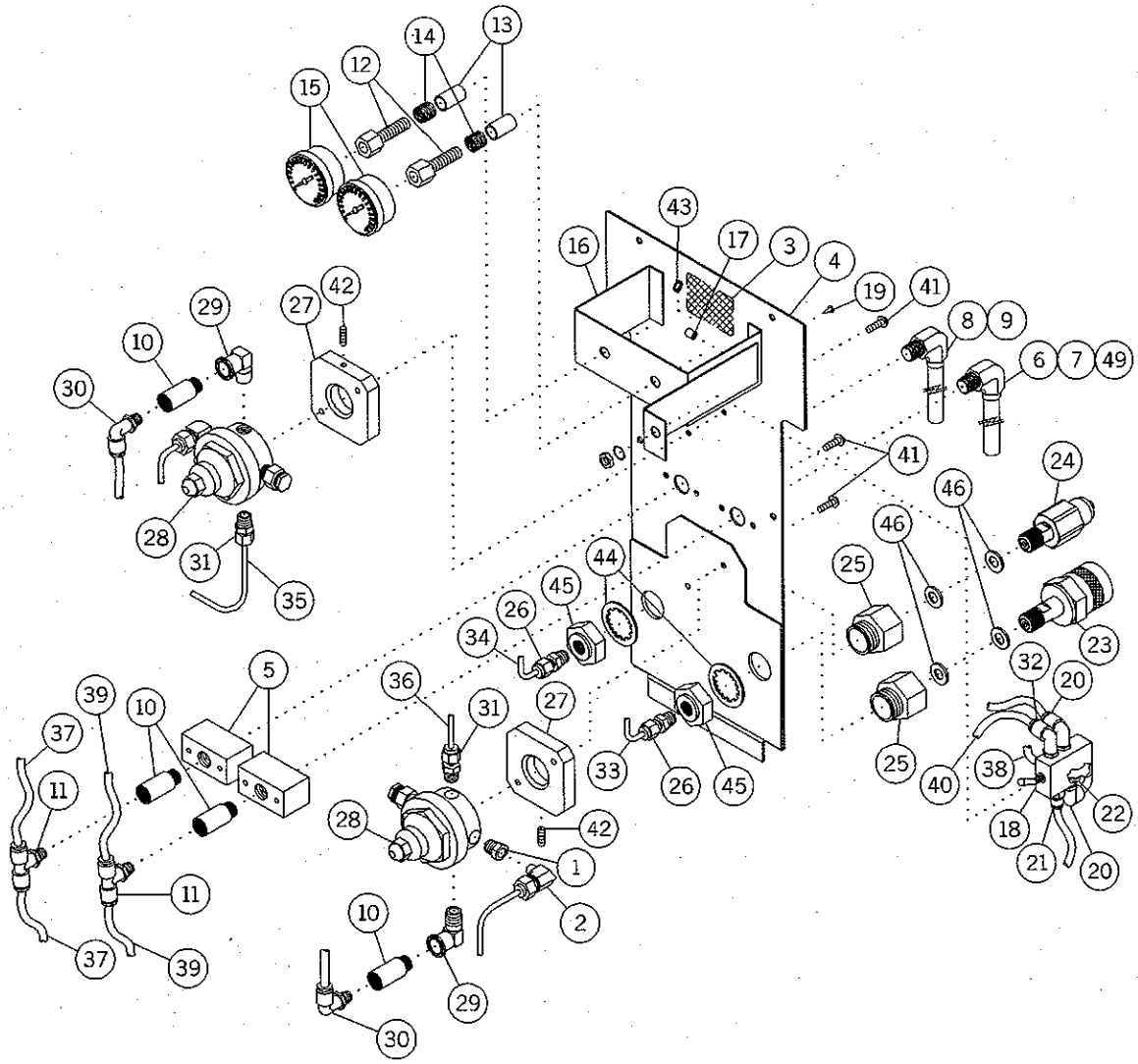


Table 6.13: Gas Supply Assembly with Oxygen/Air Reserves and Deutsche Industrie Norm (DIN) Cylinder Fittings—Blue/Green and Yellow Hoses (81 500 88-R/90-R) or Blue/White and Black Hoses (81 501 91-R/92-R)

Item Number	Part Number	Quantity	Description
1	68 504 09	2	Bushing, ¼" National Pipe Thread (NPT)—1/8" NPT, brass, HpO_2
2	81 500 30	2	Elbow, 0.19" tubing swage—1/8" NPT male, brass, HpO_2
3	Reference only	1	Label, data tag, 1.81" square
4	81 500 01	1	Chassis, gas supply, with cylinder holes
5	81 500 06	2	Manifold, pipeline
6	81 501 52	1	Hose assembly, oxygen, blue, 10' (81 500 88-R and 81 501 91-R only)
7	81 501 55	1	Hose assembly, oxygen, green, 10' (81 500 90-R only)
8	81 501 54	1	Hose assembly, medical air, yellow, 10' (81 500 88-R/90-R only)
9	81 501 51	1	Hose assembly, medical air, black, 10' (81 501 91-R/92-R only)
10	81 500 43	4	Check valve, ¼" NPT male in, female out
11	81 500 21	2	Tee, ¼" outside diameter tubing, ¼" NPT male branch
12	81 500 32	2	Connector, bulkhead, 0.12" tubing swage—1/8" NPT female, HpO_2
13	81 500 03	2	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.48" long, stainless steel
14	81 500 08	2	Spring, compression, 0.480" outside diameter, 0.045" wide, 0.875" long
15	81 500 36	2	Gauge, pressure, 0 psi-4000 psi, HpO_2
16	81 500 02	1	Bracket, pneumatic valve
17	99 116 91	2	Standoff #6-32 inside diameter, ¼" outside diameter, ¼" long, brass
18	81 500 41	1	Valve, control, miniature five-way

Item Number	Part Number	Quantity	Description
19	68 602 02	1	Plug, panel fastening, 0.182"-0.192", Canoe®[a]
20	81 500 22	2	Elbow, ¼" outside diameter tubing—1/8" NPT male
21	81 500 25	1	Connector, ¼" outside diameter tubing—1/8" NPT male
22	78 456 08	1	Pipe plug, 1/8" NPT, hex, socket head, brass
23	81 501 22	1	Connector, DIN, oxygen cylinder, HpO_2
24	81 501 23	1	Connector, DIN, air cylinder
25	81 500 34	2	Adapter, high pressure cylinder, HpO_2
26	81 500 28	2	Connector, 0.19" tubing swage—¼" NPT male, brass, HpO_2
27	81 500 05	2	Block, mounting, pressure regulator
28	81 501 69	2	Regulator, 65 psi/pressure relief, HpO_2
29	81 500 37	2	Elbow, street, 90°, ¼" NPT brass
30	81 500 23	2	Elbow, ¼" outside diameter tubing—¼" NPT male
31	81 500 27	2	Connector, 0.12" tubing swage—¼" NPT male, brass, HpO_2
32	81 500 24	1	Elbow, 0.312" outside diameter tubing—1/8" NPT male
33	81 501 06	1	Tubing, formed, 3/16" outside diameter, HpO_2
34	81 501 07	1	Tubing, formed, 3/16" outside diameter, HpO_2
35	81 501 34	1	Tubing, copper, 0.12" outside diameter, 14.00" long, HpO_2
36	81 501 33	1	Tubing, copper, 0.12" outside diameter, 12.00" long, HpO_2
37	81 501 12	2	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 12.00" long

a.Canoe® is a trademark of Illinois Tool Works, Inc.

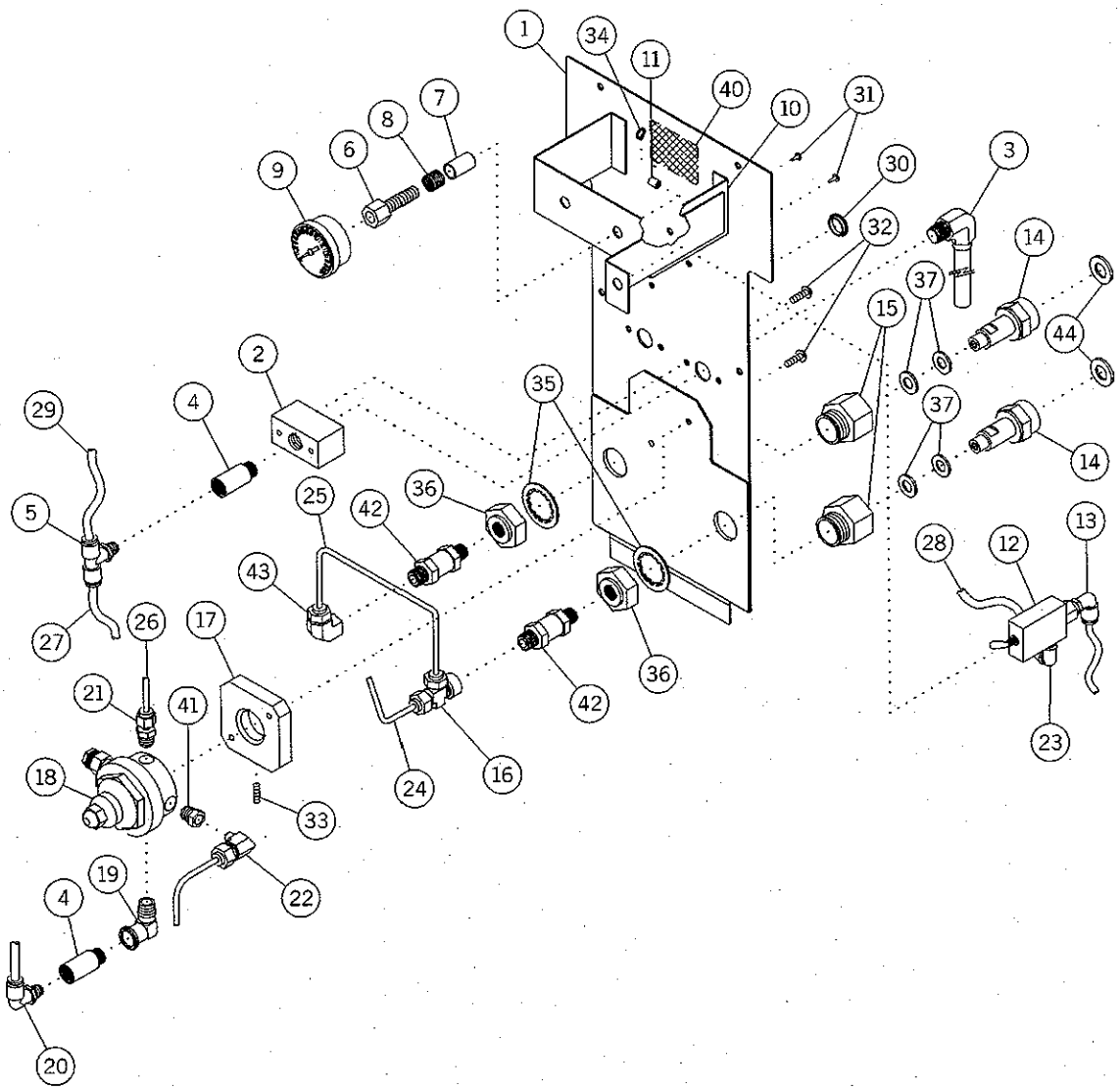
Item Number	Part Number	Quantity	Description
38	81 501 13	1	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 21.00" long
39	81 501 14	2	Tubing polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
40	81 501 37	1	Tubing polyethylene, 0.187" inside diameter, 0.312" outside diameter, 7½" long
41	99 031 99	8	Screw, #8-32 x ½", truss, phillips, stainless steel, Nylok®[a]
42	99 042 00	2	Screw, #10-32 x ½", sems external, socket, stainless steel, cap
43	99 181 48	2	Ring, retaining, push-on, stainless steel, 0.010" thick
44	99 129 85	2	Washer, lock, internal, 7/8", steel, cadmium-plated
45	99 114 50	2	Nut, hex, jam, 7/8"-14, steel, zinc-plated
46	99 123 70	4	Washer, flat, 0.19" inside diameter, 0.56" outside diameter, 0.06" nylon, HpO_2
47	99 900 26 *	As required	Tape, pipe junction seal, Teflon®[b], ½"
48	99 901 38 *	As required	Loctite®[c] screwlock #222
49	81 501 53	1	Hose assembly, oxygen, white, 10' (81 501 92 only)

a.Nylok® is a registered trademark of Nylok Fastener Corporation.
b.Teflon® is a registered trademark of E. I. du Pont and de Nemours and Company.
c.Loctite® is a registered trademark of Loctite Corporation.

* Item not shown.

Gas Supply Assembly with Ente Nationale Italiano di Unificazione (UNI) Cylinder Fittings, Oxygen Reserve, and White Hoses (81 500 84)

Figure 1. Gas Supply Assembly with Ente Nationale Italiano di Unificazione (UNI) Cylinder Fittings, Oxygen Reserve, and White Hoses (81 500 54)



m221de209

Table 1: Gas Supply Assembly with Ente Nationale Italiano di Unificazione (UNI) Cylinder Fittings, Oxygen Reserve, and White Hoses (81 500 54)

Item Number	Part Number	Quantity	Description
1	81 500 01	1	Chassis, gas supply, with cylinder holes
2	81 500 06	1	Manifold, pipeline
3	81 501 53	1	Hose assembly, oxygen, white, 10'
4	81 500 43	2	Check valve, ¼" National Pipe Thread (NPT) male in, female out
5	81 500 21	1	Tee, ¼" outside diameter tubing, ¼" NPT male branch
6	81 500 32	1	Connector, bulkhead, 0.12" tube swage—1/8" NPT female, HpO_2
7	81 500 03	1	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.480" long, stainless steel
8	81 500 08	1	Spring, compression, 0.480" outside diameter, 0.045" wide, 0.875" long
9	81 500 36	1	Gauge, pressure, 0 psi-4000 psi, HpO_2
10	81 500 02	1	Bracket, pneumatic valve
11	99 116 91	2	Standoff #6-32 inside diameter, ¼" outside diameter, ¼" long, brass
12	81 500 40	1	Valve, control, mini three-way
13	81 500 22	1	Elbow, ¼" outside diameter tubing—1/8" NPT male
14	81 501 75	2	Connector, UNI, oxygen cylinder, HpO_2
15	81 500 34	2	Adapter, high pressure cylinder, HpO_2
16	81 501 72	1	Tee, 0.19" tube swage—1/8" NPT female—0.19" tube, HpO_2
17	81 500 05	1	Block, mounting, pressure regulator
18	81 501 69	1	Regulator, 65 psi/pressure relief, HpO_2
19	81 500 37	1	Elbow, street, 90°, ¼" NPT, brass
20	81 500 23	1	Elbow, ¼" outside diameter tubing—¼" NPT, male
21	81 500 27	1	Connector, 0.12" tubing swage—¼" NPT male, brass, HpO_2

Item Number	Part Number	Quantity	Description
22	81 500 30	1	Elbow, 0.19" tube swage—1/8" NPT male, brass, HpO_2
23	81 500 24	1	Elbow, 0.312" outside diameter tubing—1/8" NPT male
24	81 501 08	1	Tubing, formed, 3/16" outside diameter, HpO_2
25	81 501 05	1	Tubing, formed, 3/16" outside diameter, HpO_2
26	81 501 33	1	Tubing, copper, 0.12" outside diameter, 12.00" long, HpO_2
27	81 501 11	1	Tubing, polyethylene, 0.25" outside diameter, 0.170 inside diameter, 7.00" long
28	81 501 38	1	Tubing, polyethylene, 0.187" inside diameter, 0.312" outside diameter, 11.00" long
29	81 501 14	1	Tubing polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
30	81 500 42	1	Plug button, nylon, 0.62" hole
31	68 602 02	5	Plug, panel fastening, 0.182"-0.192", Canoe®[a]
32	99 031 99	4	Screw, #8-32 x ½", truss, phillips, stainless steel, Nylok®[b]
33	99 042 00	1	Screw, #10-32 x ½", sems external, socket, stainless steel, cap
34	99 181 48	2	Ring, retaining, push-on, stainless steel, 0.010" thick
35	99 129 85	2	Washer, lock, internal, 7/8", steel, cadmium-plated
36	99 114 50	2	Nut, hex, jam, 7/8"-14, steel, zinc-plated

a.Canoe® is a trademark of Illinois Tool Works, Inc.
b.Nylok® is a registered trademark of Nylok Fastener Corporation.

Item Number	Part Number	Quantity	Description
37	99 123 70	4	Washer, flat, 0.19" inside diameter, 0.56" outside diameter, 0.06", nylon, HpO_2
38	99 900 26*	As required	Tape, pipe junction sealant, Teflon®[a], ½"
39	99 901 38*	As required	Loctite®[b] screwlock #222
40	Reference only	1	Label, data tag, 1.81" square
41	68 504 09	1	Bushing, ¼" NPT—1/8" NPT, brass, HpO_2
42	67 353 14	2	Check valve, gas, 1/8" NPT male, HpO_2
43	81 501 71	1	Elbow, 90°, 0.19" tube—1/8" NPT female, brass, HpO_2
44	81 501 49	2	Washer, 0.728" outside diameter x 0.39" inside diameter x 0.078" thick, nylon

a.Teflon® is a registered trademark of E. I. du Pont and de Nemours and Company.
b.Loctite® is a registered trademark of Loctite Corporation.

* Item not shown.

Gas Supply Assembly with Oxygen/Air Reserve, Ente Nationale Italiano di Unificazione (UNI) Cylinder Fittings, and White/Black Hoses (81 500 89-R)

Figure 2. Gas Supply Assembly with Oxygen/Air Reserve, Ente Nationale Italiano di Unificazione (UNI) Cylinder Fittings, and White/Black Hoses (81 500 89)

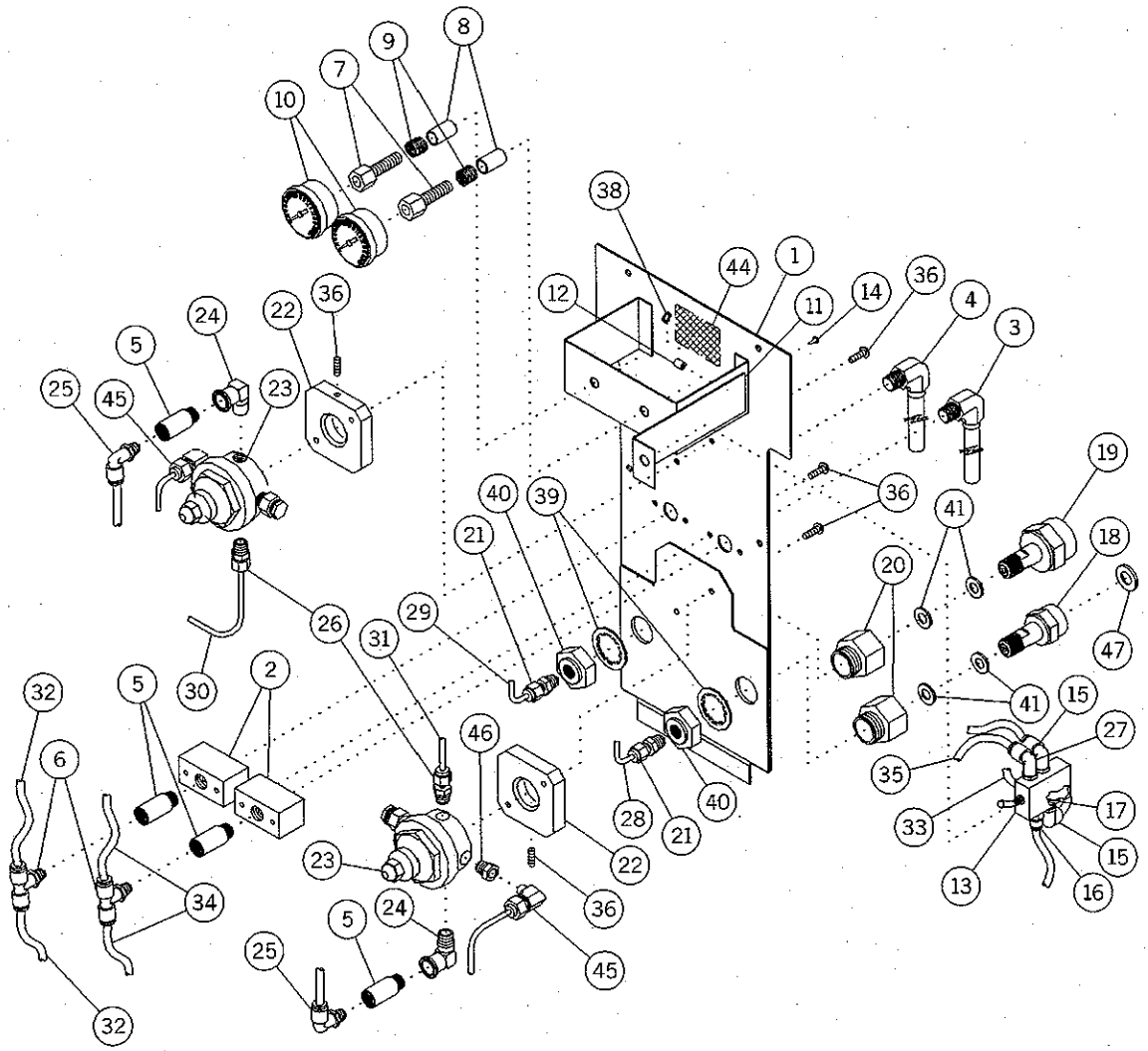


Table 2: Gas Supply Assembly with Oxygen/Air Reserve, Ente Nationale Italiano di Unificazione (UNI) Cylinder Fittings, and White/Black Hoses (81 500 89-R)

Item Number	Part Number	Quantity	Description
1	81 500 01	1	Chassis, gas supply, with cylinder holes
2	81 500 06	2	Manifold, pipe
3	81 501 53	1	Hose assembly, oxygen, white, 10'
4	81 501 51	1	Hose assembly, medical air, black, 10'
5	81 500 43	4	Check valve, ¼" National Pipe Thread (NPT) male in, female out
6	81 500 21	2	Tee, ¼" outside diameter tubing, ¼" NPT male branch
7	81 500 32	2	Connector, bulkhead, 0.12" tube swage—1/8" NPT female, HpO_2
8	81 500 03	2	Spacer, 0.315" inside diameter, 0.375" outside diameter, 0.480" long, stainless steel
9	81 500 08	2	Spring, compression, 0.480" outside diameter, 0.045" wide, 0.875" long
10	81 500 36	2	Gauge, pressure, 0 psi-4000 psi, HpO_2
11	81 500 02	1	Bracket, pneumatic valve
12	99 116 91	2	Standoff #6-32 inside diameter, ¼" outside diameter, ¼" long, brass
13	81 500 41	1	Valve, control, mini five-way
14	68 602 02	1	Plug, panel fastening, 0.182"-0.192", Canoe®[a]
15	81 500 22	2	Elbow, ¼" outside diameter tubing—1/8" NPT male
16	81 500 25	1	Connector, ¼" outside diameter tubing—1/8" NPT male
17	78 456 08	1	Pipe plug, 1/8" NPT, hex socket head, brass
18	81 501 75	1	Connector, UNI, oxygen cylinder, HpO_2
19	81 501 76	1	Connector, UNI, air cylinder
20	81 500 34	2	Adapter, high pressure cylinder, HpO_2

a.Canoe® is a trademark of Illinois Tool Works, Inc.

Item Number	Part Number	Quantity	Description
21	81 500 28	2	Connector, 0.19" tubing swage—¼" NPT male, brass, HpO_2
22	81 500 05	2	Block, mounting, pressure regulator
23	81 501 69	2	Regulator, 65 psi/pressure relief, HpO_2
24	81 500 37	2	Elbow, street, 90°, ¼" NPT, brass
25	81 500 23	2	Elbow, ¼" outside diameter tubing—¼" NPT male
26	81 500 27	2	Connector, 0.19" tubing swage—¼" NPT male, brass, HpO_2
27	81 500 24	1	Elbow, 0.312" outside diameter tubing—1/8" NPT male
28	81 501 06	1	Tubing, formed, 3/16" outside diameter, HpO_2
29	81 501 07	1	Tubing, formed, 3/16" outside diameter, HpO_2
30	81 501 34	1	Tubing, copper, 0.12" outside diameter, 14.00" long, HpO_2
31	81 501 33	1	Tubing, copper, 0.12" outside diameter, 12.00" long, HpO_2
32	81 501 12	2	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 12.00" long
33	81 501 13	1	Tubing, polyethylene, ¼" outside diameter, 0.170" inside diameter, 21.00" long
34	81 501 14	2	Tubing polyethylene, ¼" outside diameter, 0.17" inside diameter, 7¾" long
35	81 501 37	1	Tubing polyethylene, 0.187" inside diameter, 0.312" outside diameter, 7½" long
36	99 031 99	8	Screw, #8-32 x ½", truss, phillips, stainless steel, Nylok®[a]

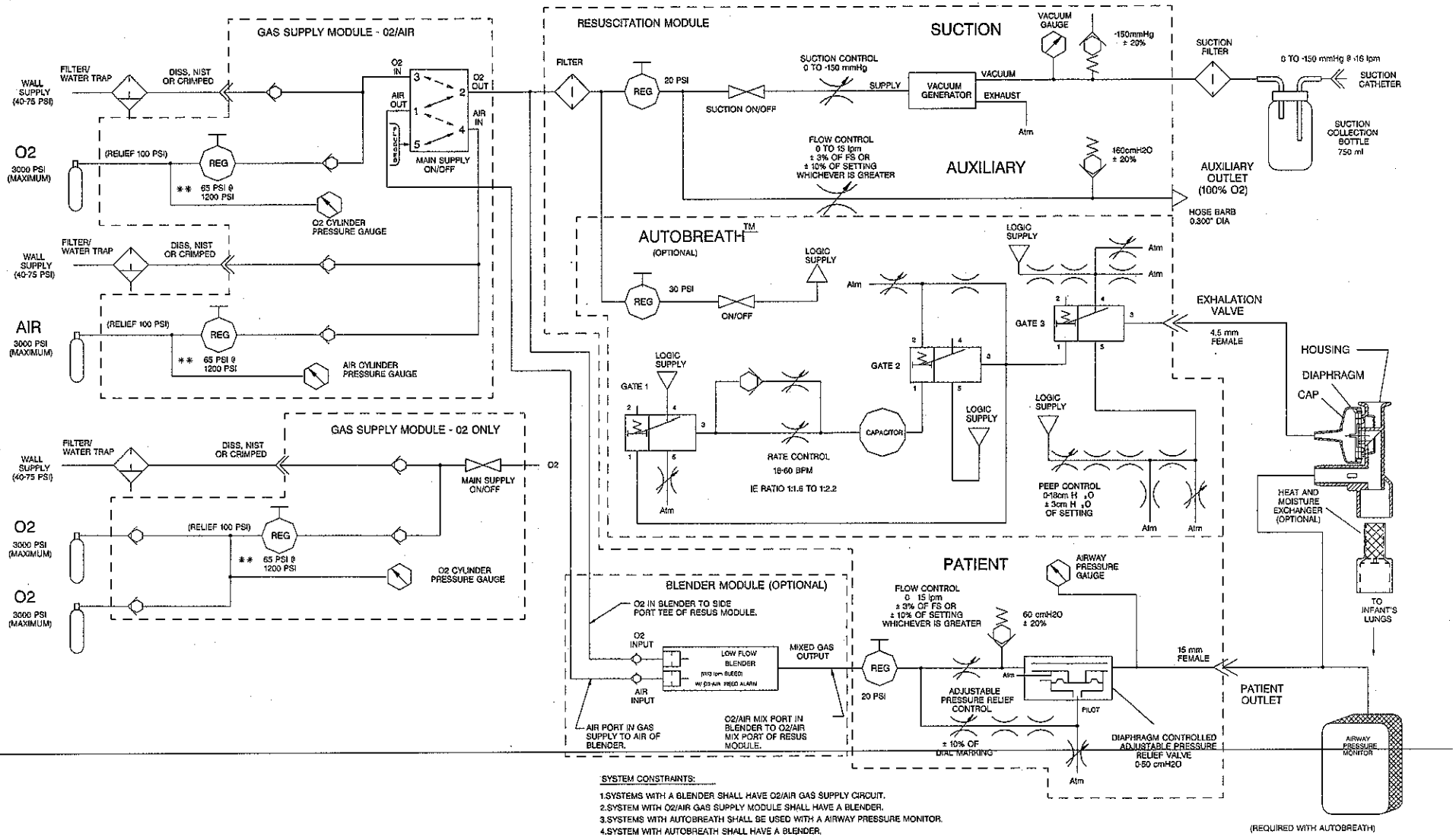
a.Nylok® is a registered trademark of Nylok Fastener Corporation.

Item Number	Part Number	Quantity	Description
37	99 042 00	2	Screw, #10-32 x ½", sems external, socket, stainless steel, cap
38	99 181 48	2	Ring, retaining, push-on, stainless steel, 0.010" thick
39	99 129 85	2	Washer, lock, internal, 7/8", steel, cadmium-plated
40	99 114 50	2	Nut, hex, jam, 7/8"-14, steel, zinc-plated
41	99 123 70	4	Washer, flat, 0.19" inside diameter, 0.56" outside diameter, 0.06", nylon, HpO_2
42	99 900 26*	As required	Tape, pipe junction sealant, Teflon®[a], ½"
43	99 901 38*	As required	Loctite®[b] screwlock #222
44	Reference only	1	Label, data tag, 1.81" square
45	81 500 30	2	Elbow, 0.19" tube swage—1/8" NPT male, brass, HpO_2
46	68 504 09	2	Bushing, ¼" NPT—1/8" NPT, brass, HpO_2
47	81 501 49	1	Washer, 0.728" outside diameter x 0.390" inside diameter x 0.078" thick, nylon

a.Teflon® is a registered trademark of E. I. du Pont and de Nemours and Company.
b.Loctite® is a registered trademark of Loctite Corporation.

* Item not shown.

Pneumatic System with the AutoBreath™ Feature Infant Resuscitator Schematic



SYSTEM CONSTRAINTS:

1. SYSTEMS WITH A BLENDER SHALL HAVE O2/AIR GAS SUPPLY CIRCUIT.
2. SYSTEM WITH O2/AIR GAS SUPPLY MODULE SHALL HAVE A BLENDER.
3. SYSTEMS WITH AUTOBREATH SHALL BE USED WITH A AIRWAY PRESSURE MONITOR.
4. SYSTEM WITH AUTOBREATH SHALL HAVE A BLENDER.

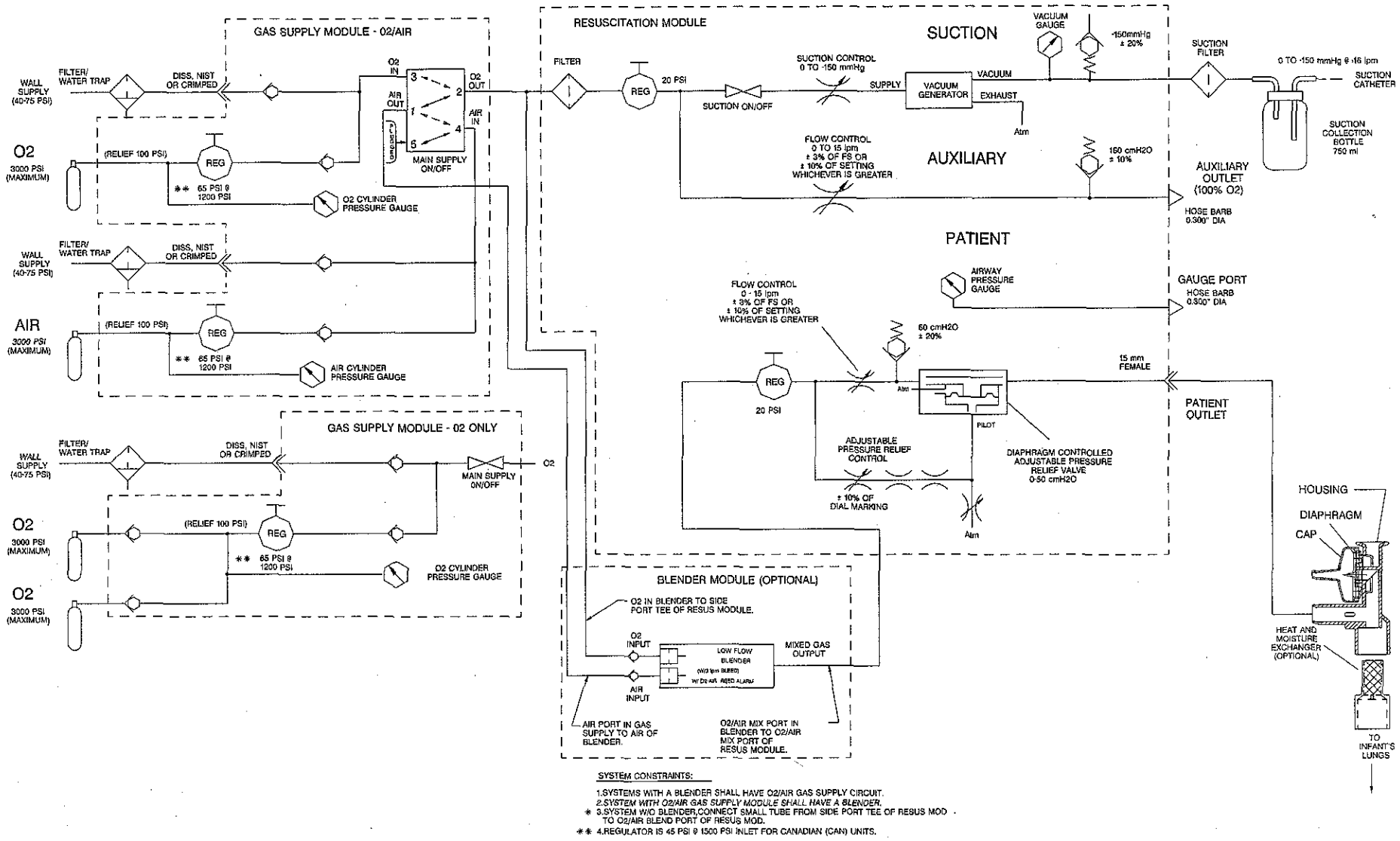
* 5. SYSTEM W/O BLENDER, CONNECT SMALL TUBE FROM SIDE PORT TEE IN RESUS MOD TO O2/AIR BLAND PORT IN RESUS MOD.

** 6. REGULATOR IS 45 PSI @ 1500 PSI INLET FOR CEU (UK) AND CANADIAN (CAN) UNITS.

m221de105

FO 7-8

Pneumatic System without AutoBreath™ Feature Infant Resuscitator Schematic



SYSTEM CONSTRAINTS:

1.SYSTEMS WITH A BLENDER SHALL HAVE O2/AIR GAS SUPPLY CIRCUIT.
2.SYSTEM WITH O2/AIR GAS SUPPLY MODULE SHALL HAVE A BLENDER.
* 3.SYSTEM W/O BLENDER,CONNECT SMALL TUBE FROM SIDE PORT TEE OF RESUS MOD TO O2/AIR BLEND PORT OF RESUS MOD.
** 4.REGULATOR IS 45 PSI @ 1500 PSI INLET FOR CANADIAN (CAN) UNITS.

m221de106